

CHAPTER 12

Implementation and Effectiveness

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This chapter summarizes the actions (compliance measures) that have been implemented under the *Regional Plan*. This assessment relies on available research findings as well as results from this evaluation, to assess the effectiveness of the *Regional Plan* in moving the Region toward achieving adopted Threshold Standards. Most programs and projects implemented to aid in the attainment of adopted Threshold Standards require broad multi-sector and multi-agency partnerships. Therefore, this assessment looks to programs, projects, and activities implemented not just by TRPA, but also by the broad range of our supporting partners. Implementation and effectiveness of the TRPA Monitoring Program is addressed through the review of directives provided in Chapter 16 of the *Code of Ordinances* and Resolution 82-11. In addition, a cumulative accounting of Regional planning activities is provided. By design, this chapter fulfills reporting requirements established in the *Code of Ordinances* Section 16.6 (Compliance Measures), 16.8.2 (Cumulative Accounts), and 16.9.1.A (Periodic Progress Reports).

Summary of the Implementation and Effectiveness of the 1987 Regional Plan

The *Regional Plan* implemented a broad suite of policies, ordinances, and land use zoning requirements that were consistent with the directives of the *Bi-State Compact* and aided in the drive toward achievement and maintenance of adopted Threshold Standards. The core of the *Regional Plan* is a set of documents that includes the Goals and Policies (TRPA 1986), the *Code of Ordinances* (TRPA 1987a as amended in March 2012) and Plan Area Statements (various dates). The TRPA Goals and Policies (TRPA 1986) advanced broad principles intended to guide land use and project and program decision-making in the Region. Adopted Threshold Standards labeled as “Policy Statements” and “Management Standards” in TRPA Resolution 82-11 were incorporated into the TRPA Goals and Policies and applied to programs, projects, and activities in the *Code of Ordinances*. The *Code of Ordinances* provides specific regulatory details on how a project or activity is allowed to proceed on Tahoe’s landscape, and is implemented through TRPA’s project review process and code enforcement program. The *Code of Ordinances*, like the Goals and Policies, is broad in scope, and includes regulations intended to govern virtually all activities that have the potential to impact the Region’s ability to achieve and maintain adopted Threshold Standards. The *Code of Ordinances* also established programs needed to address legacy environmental impacts. The Plan Area Statements (TRPA 1987b) map and narratively describe where different land uses are allowed and specify geographic limits to development intensity, including limits on noise levels and recreational capacity – keeping in line with the Compacts direction to establish “carrying capacities” for the Region.

Between 1987 and 2010, TRPA considered and adopted several amendments to the *Regional Plan* to incorporate best available science and make necessary adjustments to accommodate environmentally beneficial projects and programs. Starting in the 1990s, Threshold Evaluations and other studies made it clear that regulation alone would not achieve and maintain adopted Threshold Standards; the environmental impact of legacy land uses and urban development that was built prior to the *Regional Plan* continued to adversely impact the Region. To remedy this, TRPA amended the *Code of Ordinances* to include the Environmental Improvement Program (EIP; see Chapter 15 *Code of Ordinances*). The EIP, initiated in 1997, leveraged and secured federal, state, local, and private funding for the implementation of erosion control and storm water treatment infrastructure, wetland restoration, and other environmentally-beneficial programs and projects.

Research and monitoring over the past 25 years was relied upon to characterize the effectiveness of the *Regional Plan*, because policy- and management-specific effectiveness monitoring data are generally lacking. Overall, status and trend monitoring data indicate that not all standards are being achieved. However, available trend data indicate that environmental conditions in the Basin are mostly stable or improving. It may be concluded that the *Regional Plan* and associated programs, controls, and implemented actions appeared to have at least short-circuited further degradation to Lake Tahoe, and at best, improved environmental conditions. Improving trends in some cases are subtle, suggesting that more effective policy and management actions are needed to hasten—or to make more feasible—attainment of adopted Threshold Standards.

Water Quality

The majority of policies, ordinances, and programs adopted by TRPA are designed to support the attainment and maintenance of water quality standards. Land use and impervious coverage limitations, and the implementation of several EIP-related programs target the control of erosion and treatment of stormwater. These actions are believed to benefit other Threshold Categories as well. For example, significant efforts to control erosion and reduce sediment delivery to Lake Tahoe are also suspected to benefit Lake Tahoe's fisheries. Development setback and buffer ordinances not only protect water quality, but also benefit wildlife, fish, vegetation, soils and scenic quality values.

This report concluded that the trend in winter average pelagic Lake Tahoe transparency over the last decade has turned the corner, and the trend now, albeit slowly, appears to be heading toward Threshold Standard attainment. Although the annual average level of Lake Tahoe continues to decline, the rate of decline has slowed when compared to the rate of decline prior to the adoption of the *Regional Plan* and the EIP. Tributary water quality indicators indicate stable or improving conditions. The Pelagic Lake Tahoe Primary Phytoplankton Productivity indicator, which responds to nutrient loading to Lake Tahoe, continues to show rapid decline relative to the standard. Despite the fact that many of these indicators have yet to achieve prescribed standards adopted over 25 years ago, other non-threshold indicators suggest that Lake Tahoe is still maintaining its unique ecological status as an "ultraoligotrophic" lake (Figure 12-1)¹.

¹ The trophic status of a lake is the degree of biological production within a lake—a key component of Lake Tahoe's water quality. Trophic status is usually based on the total mass of algae in a lake, which is represented by the concentration of photosynthetic pigment (chlorophyll-a) in water samples. Ultra-oligotrophic lakes contain very low levels of nutrients (such as phosphorus), which act to limit biological production, meaning a lower algal biomass. Oligotrophic and Ultraoligotrophic (i.e., very oligotrophic) lakes tend to have extremely clear water and relatively high levels of dissolved oxygen throughout the year. In other lakes where biological productivity is extremely high, water quality can be impaired to the point where fish die-offs occur and some recreational activities such as swimming may not be advisable. The concept of trophic status is based on changes in nutrient

Extensive research and modeling conducted for the Lake Tahoe Total Maximum Daily Load (TMDL) found that very fine sediments are the primary factor impacting Lake Tahoe transparency and the majority of these pollutants originate from Tahoe's urbanized landscape. This research also confirmed that nutrient delivery to the Lake should continue to be addressed by policy and management actions because nutrients feed free-floating and light-absorbing algae. These same pollutants are suspected of impacting Lake Tahoe's nearshore conditions.

The results of TMDL research, the findings of stable to moderate improvement in tributary pollutant concentrations, and little or no change in pollutant loading to Lake Tahoe, indicated that adopted policies and programs have been at least partially effective at holding the line in Lake transparency decline. Monitoring results and research also suggest that more effective stormwater management and land use policies may be needed to move the Region toward achieving adopted Threshold Standards for pelagic Lake Tahoe.

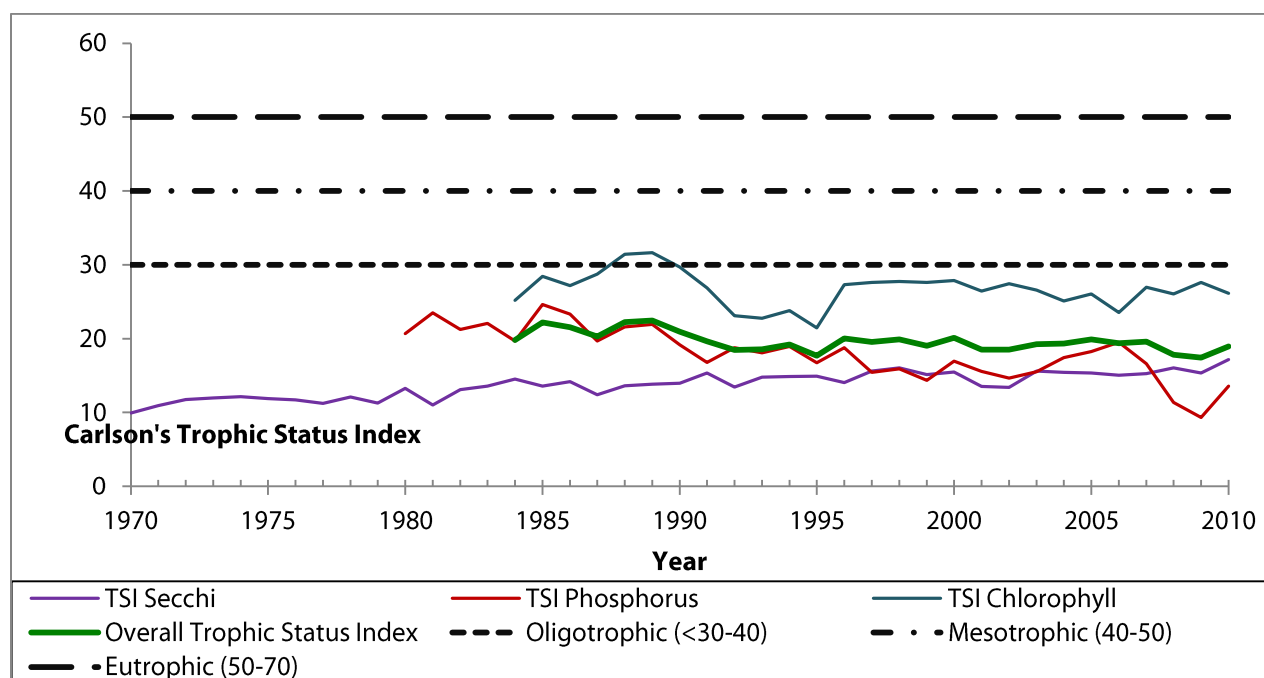


Figure 12-1. Graph showing the application of Carlson's Trophic State (or Status) Index to pelagic Lake Tahoe data.² The index uses a log transformation of measured Secchi disk values as a measure of algal biomass on a scale from 0 - 110. Each increase of ten units on the scale represents a doubling of algal biomass. Because chlorophyll a and total phosphorus are usually closely correlated to Secchi disk measurements, these parameters can also be assigned trophic status index values and can be combined to provide an integrated measure of trophic status. The Carlson Trophic Status Index is useful for comparing lakes within a region and for assessing changes in a lake's trophic status over time. The goal for Lake Tahoe is to maintain annual Carlson's Trophic Index values below 30. As of 2010, the integrated index value for Lake Tahoe's pelagic zone was 18.9, indicating the Lake is retaining its status as "ultraoligotrophic."

levels (measured by total phosphorus) cause changes in algal biomass (measured by chlorophyll a) which in turn causes changes in lake clarity (measured by Secchi disk transparency).

² TSI Secchi = $60 - 14.41 \ln \text{Secchi disk (meters)}$; TSI Chlorophyll = $9.81 \ln \text{Chlorophyll a } (\mu\text{g/L}) + 30.6$; TSI Phosphorus = $14.42 \ln \text{Total phosphorus } (\mu\text{g/L}) + 4.15$; Overall Trophic Status Index = $(\text{TSI Secchi} + \text{TSI Phosphorus} + \text{TSI Chlorophyll a})/3$.

Air Quality

Available status and trend monitoring data for air quality indicate that the Region is currently meeting the majority of applicable standards. Evidence suggests that state and federal tail-pipe emission standards and newer automobile designs have likely played a significant role in moving the Region toward attainment of air pollutant-related Threshold Standards, and that TRPA-sponsored projects, controls, and programs have contributed to the attainment of traffic volume-related standards. Transport of air pollutants from outside of the Region (e.g., wildfire smoke, ozone) will likely continue to affect air quality and the Region's ability to meet all air pollutant-related standards. Additional Regionally-scaled air pollution control measures may be needed to keep the Region in compliance with adopted standards.

Soil Conservation

Raumann and Cablk (2008) demonstrated that the implementation of the *Regional Plan* was effective at reducing the rate of urban development and halted additional urban development on sensitive wetlands in the southern portion of the Lake Tahoe Basin (Figure 12-2).

TRPA land-use regulations and land acquisition programs implemented by the U.S. Forest Service, Nevada State Lands, and the California Tahoe Conservancy have likely also contributed to this result. To date, public land acquisition programs have retired development potential from over 8,500 sensitive private parcels. Preliminary analysis of hard impervious cover using 2010 LiDAR and Multispectral data, and a contemporary soil survey indicate that the Region is meeting eight of nine management targets for impervious cover. Actions taken by TRPA to slow the rate of development and prohibit urban development in stream environment zones has also promoted the achievement and maintenance of other Threshold Standards, such as standards for wildlife, water quality, vegetation, recreation, fisheries, air quality, and scenic resources.

Consistent with findings of past Threshold Evaluations, the Region is not meeting the management target for wetland and meadow-associated land capability district 1b. This result suggests that some land use policies in the *Regional Plan* could be made more effective in moving the Region toward achieving this management target, and that alternative land use policies should be considered to further incentivize the removal and relocation of coverage from the 1b land capability district. It may also be productive to conduct an assessment that identifies which impervious surfaces within the 1b land capability district can be realistically relocated given property rights issues and associated costs. The results of such an analysis may have implications for adjustments to the adopted impervious surface and riparian vegetation management targets.

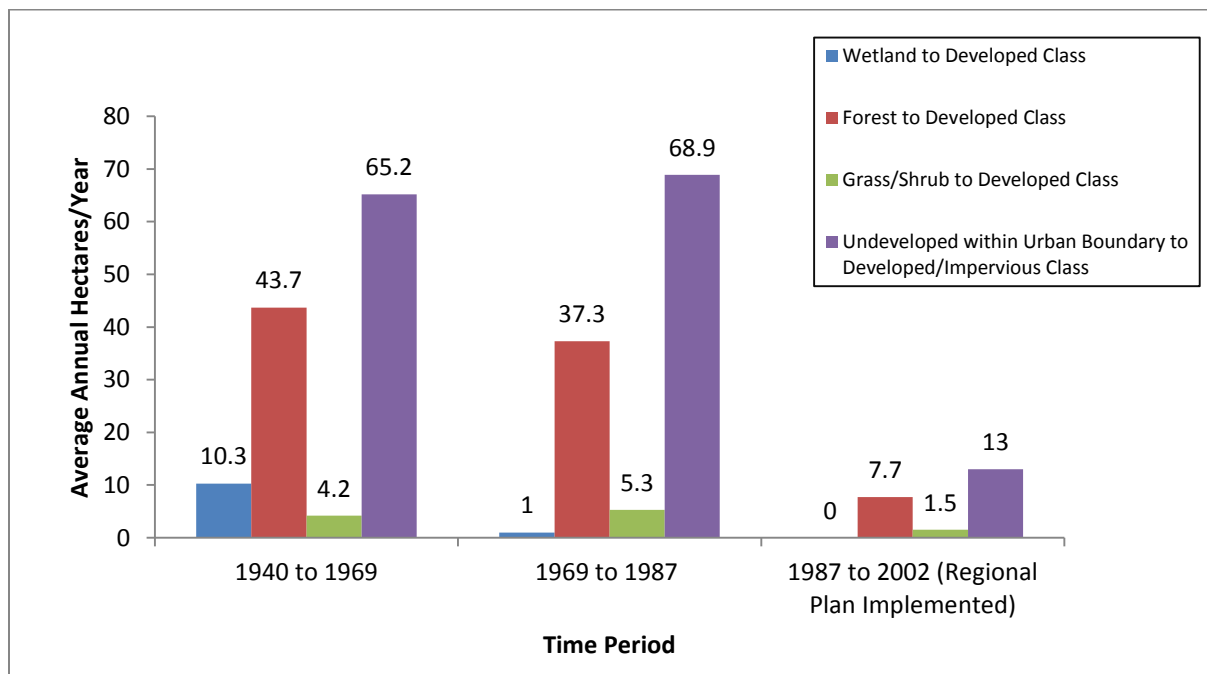


Figure 12-2. Average annual rate of change (hectares/year) in major land use/cover classes from 1940 to 2002 in the southern portion of the Lake Tahoe Basin (adapted from Raumann and Cablk 2008). Since the implementation of the Regional Plan in 1987 (1987 to 2002 time period) the rate of lands converted to the developed/impervious class has declined considerably when compared to the time periods prior to 1987.

An accounting of EIP projects showed significant progress in the implementation of restoration projects designed to improve stream environment zone (SEZ) conditions. Overall, approximately 1,347 acres of disturbed SEZ have been restored or enhanced through the realignment of stream geomorphology, removal of impoundments and impervious cover, and through the removal of encroaching conifers. More than 500 acres of additional restoration work is planned for the Upper Truckee Watershed including the Upper Truckee Marsh, which is considered to be a valuable natural pollutant filtration system.

The adopted Threshold Standard prescribes that these efforts be effective at restoring stream environment zone to a “naturally functioning condition.” TRPA was unable to conclusively demonstrate the effect of stream restoration actions on a Regional scale, though effectiveness monitoring conducted on individual projects has demonstrated benefits to a variety of threshold categories (2nd Nature 2010, Tague et al. 2008, Swanson Hydrology + Geomorphology 2004).

Vegetation Preservation

Raumann and Cablk (2008) found that the rate of forest densification, and the conversion of non-forested land to forested lands, has declined since the adoption of the *Regional Plan* (Figure 12-3). This decline may not in fact be attributed to the implementation of the *Regional Plan*, but does indicate improvement because denser forests increase the risk of catastrophic wildfire and do not reflect resilient forest conditions that were once ubiquitous throughout the Sierra Nevada prior to Euro-American settlement. Shade-tolerant conifer encroachment into non-forested land, on the other hand, indicates a lack of natural disturbance processes and management attention. More management

actions are needed to restore conifer forest structure and composition, and to reclaim land acreage that had historically been classified as riparian or wetland vegetation types.

Since the 2007 Angora Fire, amendments have been made to the *Regional Plan* and funding was made available through the Southern Nevada Public Land Management Act to facilitate forest fuels reduction treatments and enhance forest health. Since 2007, more than 45,000 acres out of a total of about 90,000 acres have been treated to restore forest community structure and composition, and in the process reduce the risk of catastrophic wildfire near urban development. The restoration of forest structure will also aid in achieving the long-term threshold goals for old forest ecosystems (Dave Fournier, pers. comm. U.S. Forest Service – LTBMU). Missing from current forest treatment efforts however, is the inclusion of small-opening, overstory canopy removal projects to aid in achieving management targets associated with small diameter red fir and yellow pine forest types.

Regulations and collaboration with partner land management agencies have maintained the protection boundaries of uncommon plant communities consistent with the Threshold Standard. Nevertheless, aquatic invasive and noxious weed species have recently been detected at some sites, suggesting that additional management actions are needed. Indicators for sensitive plants were determined to be in attainment with adopted Threshold Standards, suggesting existing survey and protection policies have been effective at protecting these species. The implementation of the Tahoe Yellow Cress Conservation Strategy appears to have been especially effective at sustaining the species based on the current status and improving trend associated with the species. Although the Tahoe Yellow Cress Conservation Strategy has demonstrated its effectiveness in stabilizing the species status, it may need to be continued to avoid listing the species by the U.S. Fish and Wildlife Service and be updated to reflect lessons learned.

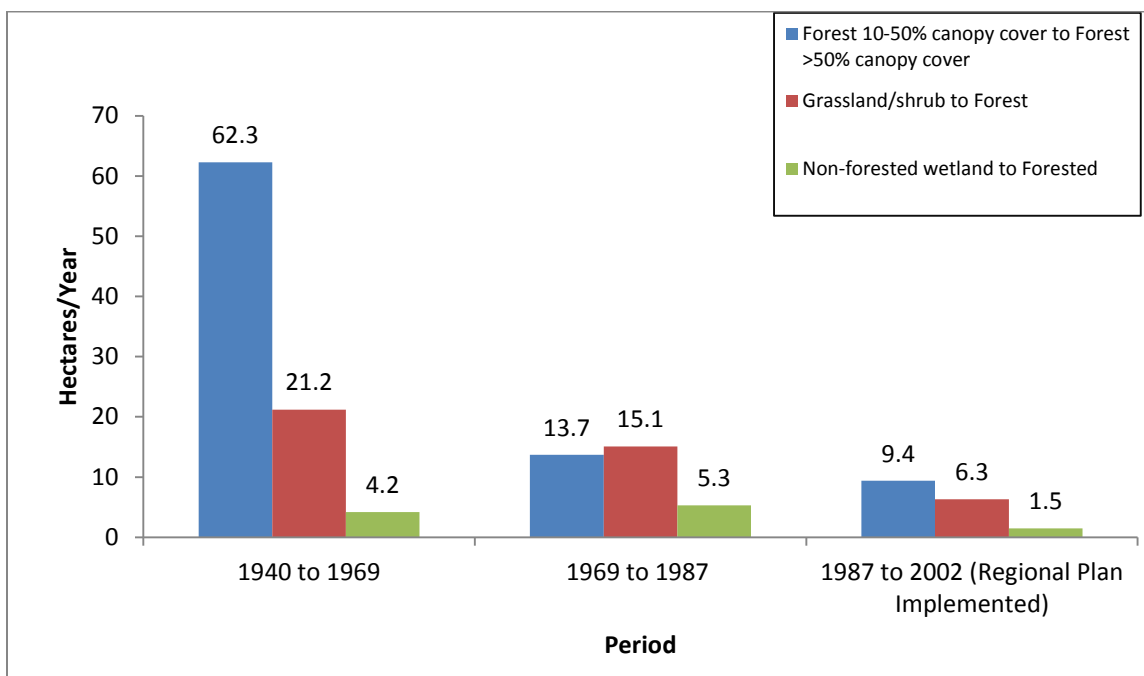


Figure 12-3. Average annual rate of change (hectares/year) in forest density, grassland/shrub to forest and non-forested wetland to forest from 1940 to 2002 in the southern portion of the Lake Tahoe Basin (adapted from Raumann and Cablk 2008). Since the implementation of the *Regional Plan* in 1987 the rate of forest densification and conifer forest encroachment into non-forested classified land has declined, when compared to time periods prior to 1987.

Wildlife

This evaluation determined that indicator trends for special interest wildlife species are either stable or improving. The TRPA project review process, along with other agencies' environmental documentation processes, appears to be effective at identifying and avoiding adverse impacts to listed species. This evaluation determined that additional on-the-ground management actions are needed to address current recreation access and legacy roads and trail densities within designated protection areas, particularly for Northern Goshawk and at waterfowl sites. It was also determined that the approach for delineating protection zones for Northern Goshawk needs to be updated to reflect scientifically supported best management practices. As addressed in Soil Conservation, above, TRPA has implemented effective strategies to protect and restore riparian "habitats of special significance" although additional reclamation of riparian habitat types are needed to achieve adopted management targets for impervious cover and riparian vegetation.

Fisheries

The current project review process, policies, and ordinances appear to have been effective due to their emphasis on the protection of submerged substrates and fish habitat in Lake Tahoe. Restoration efforts to increase acreage of suitable substrates were slowed due to the 2008 judicial invalidation of the environmental analysis of updated Shorezone programs and ordinances. Available funds from TRPA's mitigation fee program were adjusted to support meaningful on-the-ground restoration of fish habitats. It was found in this evaluation (and in previous evaluations) that the current standards and associated indicators for lake habitat are antiquated because they measure only one dimension (physical) of the littoral zone. Other dimensions (e.g., chemical and biological) of fish habitat should be measured and reported to provide a more complete assessment of the status of fish habitat conditions in Lake Tahoe. Recent studies funded through Southern Nevada Public Lands Management Act on Lake Tahoe's nearshore indicators will assist in informing amendments to indicators and standards for lake habitat.

Available data on stream habitats for fish suggest that the Region continues to support native fishes that are known to indicate "good" to "excellent" conditions (Vacirca 2010, USFS 2007, USFS 2008, USFS 2009, USFS 2010). Vacirca (2010) and Tracy and Rost (2003) documented that stream crossings associated with roads (i.e., culverts) and remnant impoundments from Comstock-era logging are probably impacting native fishes' ability to move freely within a stream's flow continuum during low-yield precipitation years. Fish inventories also revealed that Tahoe streams support non-native species that may negatively affect the quality of stream habitat for native species. Recently initiated stream bioassessment monitoring (started in 2009) conducted by TRPA in partnership with several state and federal agencies is providing an alternative, more scientifically supported approach to characterizing the status and trends of stream habitats and should be continued.

Further focus is needed from TRPA EIP partners on restoration within stream movement corridors through the re-engineering of road crossings and removal of other movement barriers. Additional policy consideration may be needed from other agencies (US Fish and Wildlife Service, California Fish and Game, Nevada Department of Wildlife) to address potential non-native species issues. The original methodology prescribed to measure fish habitat condition was poorly documented, and appears to be based on subjective criteria and biased toward supporting habitat for non-native game fishes.

TRPA and other agencies have instituted a number of regulatory actions and restoration projects that support the non-degradation management standard and policy statement set forth under the Instream Flow indicator reporting category. TRPA regulates projects and activities that have the

potential to impact the integrity of stream habitat including impacts to stream flows in the Tahoe Region (see TRPA 1986 and TRPA 1987a). In addition, other agencies have established rules that regulate the types of projects and activities that can occur in stream habitats (e.g., California Department of Fish and Game).³ A review of available TRPA permit data indicates that TRPA has only permitted temporary stream flow diversion/alterations with the ultimate project objective of stream enhancement and restoration. In no instance were permit records found indicating that TRPA permitted new permanent diversion or extraction of water from Tahoe streams. For these reasons, implementation of the non-degradation of in-stream flows has been judged to be effective.

Programs implemented since 1989 are currently underway to restore the native Lahontan Cutthroat Trout (LCT) populations to their historic lacustrine (lake) and fluvial (stream) habitats throughout the Truckee River Basin, including the Tahoe Basin⁴ (see also TRPA 2007, TRPA 2010). In 2007, TRPA joined the Tahoe Basin Recovery Implementation Team (TBRIT), which was formed as part of the on-going work to develop and implement actions to help recover LCT to the Basin. TRPA does not directly manage LCT, but rather serves to protect and restore the habitat through policy, regulation, and support of habitat improvement projects and reintroduction efforts. Two decades of research, program development, and reintroduction actions appear to be effective, as at least one self-sustaining population of LCT has been restored in the Upper Truckee Watershed.

Noise

Through TRPA's project review procedures, noise issues are addressed and mitigated at the project scale. In an attempt to reduce noise levels associated with motorized watercraft, TRPA established by ordinance a 600 foot no-wake zone around the Lake Tahoe shoreline. TRPA's watercraft team patrols Lake Tahoe's shoreline during the boating season to enforce the no-wake zone. The U.S. Forest Service, under regulation CFR 261.4(d), prohibits causing public inconvenience, annoyance, or alarm by making unreasonably loud noise. Although this can include a wide range of potential loud activities, the U.S. Forest Service also has specific regulations for decibel levels generated from motorized vehicles on applicable forest lands. Other actions include motor vehicle exhaust system modification restrictions, which the California Highway Patrol (CHP) has the necessary authority to enforce. These restrictions, under California Vehicle Code Section 27151, prohibit modification of the exhaust system to amplify or increase the noise emitted by a vehicle (see also vehicle noise emission standards for Nevada⁵).

Even though TRPA and others have implemented actions and regulations to control noise, current policies, ordinances, and regulations may need to be adjusted to make them more effective at moving the Region toward attainment of several of the adopted noise Threshold Standards. TRPA noise Threshold Standards are set at levels where even ordinary ambient noise may cause exceedances. There is some question whether existing standards are reasonably feasible or consistent with the overall Regional Plan given current noise-reducing technology, scope of authority to control, and other factors. An in-depth review and evaluation of existing adopted noise Threshold Standards and TRPA policies should be performed and amendments considered, to address feasibility, authority, and other relevant factors.

³ California Fish and Game Code – Section 1600-1616; <http://www.leginfo.ca.gov/cgi-bin/displaycode?section=fgc&group=01001-02000&file=1600-1616>;

⁴ Short-term action plan for Lahontan cutthroat trout (*Oncorhynchus clarki hensawi*) in the Truckee River Basin (see - http://www.fws.gov/nevada/protected_species/fish/documents/lct/final_trit.pdf)

⁵ NAC 484.150 Noise emission standards for operators of vehicles.

Scenic Quality

TRPA, through its project review and permitting process, addresses and mitigates projects that have the potential to impact scenic quality. The *Code of Ordinances* specifies design standards and guidelines for new development and redevelopment projects. In 2002, Chapter 36 of the *Code of Ordinances* was amended to include additional controls to protect shoreline areas from scenic degradation due to development. Community Plans provide specific guidance on development design that is applicable to local areas. The Scenic Quality Improvement Program (SQIP) identifies a host of projects that are necessary to improve scenic conditions to facilitate achievement of adopted scenic Threshold Standard. Where appropriate, TRPA includes specific measures to improve the aesthetic quality of individual projects as special conditions of TRPA permits. Status and trend data for scenic quality indicators, which pre-date the *Regional Plan*, suggest that currently implemented programs (e.g., EIP) and actions implemented (e.g., amended design standards) have, overall, improved scenic conditions in the Region. Specifically, eight travel route road units out of 87 have moved from non-attainment to attainment within the last ten years and 31 remain out of attainment; all in developed urban areas and along the shoreline. In 2001, there were 26 out of 54 roadway units that were shy of attainment. In 2011, that number had been reduced to 19. In 2001, there were 13 out of 33 shoreline travel units that were out of attainment. By 2011 that number had been reduced to 12. Of all the scenic evaluation units assessed (n=860) in this evaluation, 93 percent have been determined to meet established scenic quality standards.

Recreation

Through its project review and permitting process, TRPA addresses and mitigates projects that could impact recreational quality. Through the EIP, projects have been implemented to improve lake access, develop a comprehensive trail system, improve recreational facilities, and improve educational programs and interpretive facilities. To date, over 93 recreational facilities have been constructed or rehabilitated as part of the EIP. Public agencies have active acquisition programs to purchase land and make it available to the public for dispersed recreation. Since before the EIP, public land management agencies purchased over 3,000 acres of land. Over the past five years, the rate of public land acquisition has slowed, but acquisitions are still occurring to increase land available for low density outdoor recreation. Acquisition programs have acquired 2,579 linear feet of shoreline since 1996 to increase public access to the lake. Public agencies and non-profit organizations have been actively increasing the number and quality of access amenities such as trails and trailheads. Recent examples of new access amenities include: the Tahoe Rim Trail Association and U.S. Forest Service added 13 miles of new trail to the Tahoe Rim Trail by; the California Tahoe Conservancy and Nevada State Parks constructed a new trailhead at the Van Sickle Bi-State Park, directly connecting (within walking distance) the largest visitor bed-base in the Region with the Tahoe Rim Trail, without the need for a drive-in trail head; the U.S. Forest Service completed numerous trail construction and improvement projects including the Lam Watah trail and trailhead near Nevada Beach, and a new trail connecting High Meadows to Starr Lake; the California Department of Parks and Recreation is in the process of constructing several new trails at the Ward Creek property; and the California Tahoe Conservancy has implemented a series of river access improvements along the Upper Truckee River. Public surveys conducted by the U.S. Forest Service support the Regional Plan's effectiveness in maintaining high quality recreation (89.9 percent satisfaction rate) in the Region (USDA Forest Service 2010) consistent with the recreation threshold Policy Statement.

To ensure a fair share distribution of recreation opportunities throughout the Region, TRPA established and implemented a "Persons at One Time" (PAOT) recreation capacity allocation system.

PAOTs are an estimate of the number of individuals that a recreation facility or area can support at any given time. PAOTs are used as both a target for desired recreation capacity, and a maximum limit to the recreational use that can be supported in an area. Currently, approximately 27 percent of the available PAOTs have been assigned. The rate of PAOT utilization has slowed slightly recently, with 1,162 PAOTs assigned over the five years since the last Threshold Evaluation (2006 – 2011), as opposed to 1,615 assigned during the previous five-year evaluation period (2001 – 2006). The consistent increase in distribution of PAOT allocations and of projects not requiring PAOT allocations, suggests that the *Regional Plan* has been effective at achieving the Policy Statement to ensure a fair share distribution of recreation opportunities.

Compliance Measures

Compliance measures are broadly defined in TRPA (1987), Section 16.2 as a “*program, regulation, or measure including, but not limited to, capital improvements, operational improvements, or controls on additional development, to reduce, avoid, or remedy an environmental impact of activities within the Tahoe Region or to promote attainment or maintenance of any threshold [standard] or any [state or federal air and water quality] standard.*” In essence, compliance measures are all the actions that TRPA, partner agencies, and private property owners implement to improve environmental quality and socioeconomic conditions in the Region. Implemented actions are captured in relevant sections of the *Regional Plan* and can be categorized as: 1) regulations (or controls) or 2) capital improvements (or environmental restoration, public facility investments).

Chapter 16 of the *Code of Ordinances* established specific reporting requirements related to compliance measures. In summary, TRPA is required to:

- Identify and evaluate compliance measures necessary to ensure attainment and maintenance of the Threshold Standards and other air and water quality Threshold Standards according to the following provisions:
 - Maintain a separate list of all compliance measures actually being implemented for each Threshold Standard, and each state and federal air and water quality standard.
 - The list shall include, for each compliance measure, a schedule showing how much and at what rate that measure is contributing, and is expected to contribute, to the attainment or maintenance of the affected Threshold Standard, or local, state, or federal standard. These schedules shall be at a level of detail consistent with the best scientific information available on cause and effect relationships.
 - Based on results of Threshold Evaluations, TRPA shall periodically update the information set forth in the list of compliance measures.

In addition to currently implemented compliance measures, TRPA is required to identify as a Threshold Evaluation reporting component “supplemental compliance measures” (TRPA 1987a, Section 32.6). Supplemental compliance measures are compliance measures which are currently not being implemented, but which TRPA may put in place to attain and maintain a Threshold Standard or state and/or federal air and water quality standard. The following summarizes requirements related to supplemental compliance measures.

- To ensure attainment and maintenance of Threshold Standards, or local, state, or federal standards, TRPA may employ supplemental compliance measures according to the following provisions:
 - In addition to the implemented compliance measures, TRPA shall maintain a list of compliance measures which it plans to implement, or could implement if necessary, to ensure the

attainment and maintenance of all Threshold Standards and state and federal air and water quality standards.

- The list shall include, for each measure, a schedule showing how much and at what rate that measure will contribute to the attainment or maintenance of Threshold Standards, and local, state, or federal standards. These schedules shall be at a level of detail consistent with the best scientific information available on cause and effect relationships.
- TRPA shall periodically update the information set forth in its list of supplemental compliance measures.
- TRPA should identify additional compliance measures, to provide maximum flexibility in determining compliance. Whenever TRPA identifies an additional compliance measure appropriate for possible implementation, TRPA shall add that measure to the list until it is removed from the list or implemented.

Appendix IE-1 in this Threshold Evaluation lists compliance measures in place and supplemental compliance measures by Threshold Category. To satisfy requirements that compliance measures be listed for each Threshold Standard, implemented actions are generalized and provided in each indicator summary narrative in the “*Programs and Actions Implemented to Improve Conditions*” section. The requirement that TRPA show how much and at what rate a compliance measure will contribute to the attainment of a Threshold Standard is problematic, and needs to be addressed as a component of the *Regional Plan* update, or through subsequent *Regional Plan* amendments. In many instances, this requirement fails to account for frequently complex, natural and anthropogenic factors that contribute to the rate at which the Region will attain a Threshold Standard. To determine a compliance measure’s relative contribution to Threshold Standard attainment would be unfeasible to research and model. This provision of the *Code of Ordinances* should be reconsidered and amended because it is not implementable in its present form.

The research and modeling needed to understand how compliance measures related to the state’s Lake Tahoe transparency standard (the Lake Tahoe TMDL) costs more than \$10 million. Consequently, fulfilling this requirement has been, and is currently well beyond TRPA’s or the Region’s funding and staffing capacity to accurately or defensibly characterize the incremental effect of each compliance measure. At best, TRPA can use best available science to characterize the causal factors (natural and anthropogenic) and activities (e.g., compliance measures) that affect achieving Threshold Standards. This approach is being pursued through the construction of conceptual models. Conceptual models were used in supporting the original *Regional Plan*, and the TRPA monitoring program has been recently revising our understanding of various systems through the construction of new conceptual models. To date the updated status and trend monitoring program has under development or has completed conceptual models for following threshold-related areas (Appendix IE-2):

- Ozone
- Particulate matter
- Carbon monoxide
- Oxides of Nitrogen
- Common vegetation and hazardous fuels
- Stream environment zones and stream habitat
- Traffic volume, vehicle miles traveled, and alternative travel mode split
- Pelagic Lake Tahoe
- Littoral (nearshore) Lake Tahoe

Updated conceptual models have been effective at communicating our current understanding of different environmental and socioeconomic systems. They provide a platform to synthesize best available scientific knowledge about a system to focus or redirect policy and conservation actions consistent with the intent of “compliance measures” mandates. Conceptual models for other threshold-related areas should be completed so that future Threshold Evaluations and reporting incorporate visual and narrative elements of these conceptual models as introductory material for improved user and reader understanding.

Implementation and Effectiveness of Regulatory Compliance Measures

Project Review and Enforcement

TRPA implements regulatory compliance measures through its detailed review of project applications submitted by project proponents, (i.e., project review) and code enforcement program. The typical project review process begins before a project proponent prepares an application for a TRPA permit. For more complex projects, the process is more rigorous—TRPA requires that the applicant prepare an Environmental Assessment or an Environmental Impact Statement to compare project alternatives and disclose potential detrimental and beneficial environmental impacts. Prior to applying for a permit, the applicant is required to verify the development potential of a subject parcel and complete an “initial environmental checklist” to disclose potential environmental impacts including potential impacts related to Threshold Standards. Once an application is complete, TRPA project review staff evaluate the proposal and associated application materials against TRPA Goals and Policies (TRPA 1986), the *Code of Ordinances* (TRPA 1987a), and Plan Area Statements (TRPA 1987b). At this stage, the agency is required to add special permit conditions as appropriate to avoid environmental impacts and make findings that the project will not impact the Region’s ability to achieve and maintain Threshold Standards. The applicant is then required to acknowledge the scope of the permit, after which, if all conditions are met, the permit is granted. The applicant has up to three years to initiate the permitted project. Prior to construction of a project, the TRPA Code Administration Program conducts an on-site pre-grade inspection with the applicant to ensure a clear understanding of the permit conditions. TRPA Code Administration Staff conduct intermediate project inspections to ensure permit conditions are being adhered to during the project’s implementation. When the project is complete, TRPA staff performs a final inspection to confirm permit conditions are satisfied.

The TRPA permitting process is rigorous and effective at ensuring project plans comply with the *Regional Plan* and the Threshold Standards that the process was designed to achieve. The effectiveness of the Code Enforcement Program can be measured by an evaluation of the permit compliance rate. TRPA tracks permit compliance for all projects following pre-grade inspections in the permit-tracking database (Accela). Accela is a new project tracking system that came on line at TRPA in 2007. Permittees must initiate implementation of a project within three years of permit acknowledgement, but a longer financing and construction schedule is permissible if approved. The agency’s goal is to achieve a compliance rate of 100 percent. The following is a summary of the permit compliance rate as of January 2012 for projects started in 2007-2011:

- For projects started in 2011 where TRPA holds a security⁶, 37 out of 125 have passed a final inspection. Eighty-eight of the projects started in 2011 have either not had a final inspection requested, have been notified with a correction notice, or require a longer construction window

⁶ A security is a monetary deposit provided by the project proponent and held in trust by TRPA that aids ensuring that permit conditions are applied to a permitted project. When permit conditions are satisfied, the security is returned to the permit holder.

to complete the project. Overall, it can be concluded that the agency's compliance rate for projects started in 2011 is currently 37 percent because the permitted projects have passed the final inspection and the security has been released. Projects started in 2011 could have up to three years left before the project is expected to be completed, depending on what type of project it is and what time of the year the project started.

- For projects started in 2010 where TRPA holds a security, 85 out of 149 have passed a final inspection. Sixty-four of the projects started in 2010 have either not had a final inspection requested, have been notified with a correction notice, or require a longer construction window to complete the project. Overall, it can be concluded that the agency's compliance rate for projects started in 2010 is currently 57 percent because the permitted projects have passed the final inspection and the security has been released. Projects started in 2010 could have up to two years left before the project is expected to be complete depending on what type of project it is and what time of the year the project started.
- For projects started in 2009 where TRPA holds a security, 115 out of 155 have passed a final inspection. Forty of the projects started in 2009 have either not had a final inspection requested, have been notified with a correction notice, or require a longer construction window to complete the project. Overall, it can be concluded that the agency's compliance rate for projects started in 2009 is currently 74 percent because the permitted projects have passed the final inspection and the security has been released. Projects started in 2009 could have up to one year left before the project is expected to be complete depending on what type of project it is and what time of the year the project started.
- For projects started in 2008 where TRPA holds a security, 169 out of 208 have passed a final inspection. Thirty-nine of the projects started in 2008 have either not had a final inspection requested, have been notified with a correction notice, or require a longer construction window to complete the project. Overall, it can be concluded that the agency's compliance rate for projects started in 2008 is currently 81 percent because the permitted projects have passed the final inspection and the security has been released. Nineteen percent of the projects permitted in 2008 are considered not completed as of January 2012. Additional follow-up will be needed to bring these permits into compliance.
- For projects started in 2007 on which TRPA holds a security, 143 out of 170 have passed a final inspection. Twenty-seven of the projects started in 2007 have either not had a final inspection requested, have been notified with a correction notice, or require a longer construction window to complete the project. Overall, it can be concluded that the agency's compliance rate for projects started in 2007 is currently 86 percent because the permitted projects have passed the final inspection and the security has been released. Fourteen percent of the projects permitted in 2007 are considered not completed as of January 2012. Additional follow-up will be needed to bring these permits into compliance.

In the past, TRPA's practice in performing final inspections was to wait until the permittee completed the project and contacted TRPA staff requesting a final inspection. Recently, TRPA has been proactive and started a new final inspection method to improve the compliance rate. Staff now uses the Accela project tracking system to identify projects that are about to expire. Prior to a project's expiration, the project is inspected. If the project is complete, the security is released. If the project is incomplete, the owner is contacted immediately and we work with the owner to complete all requirements in the project permit before final inspection.

Implementation and Effectiveness of Capital Improvement Compliance Measures

The Environmental Improvement Program (EIP) includes a wide variety of capital improvement compliance measures implemented by TRPA and regional partners to reverse legacy environmental impacts and aid in achieving and maintaining Threshold Standards. The EIP is a cooperative effort involving over 50 public and private organizations and is administered by TRPA. The mission of the EIP is to preserve, restore, and/or enhance the unique natural and human environment of the Lake Tahoe Region (TRPA 2008, TRPA 2010). The EIP defines restoration needs for attaining environmental goals or Threshold Standards, and increases the pace, feasibility, and effectiveness at which the Threshold Standards will be attained through a substantial investment of resources in capital project delivery. Partnerships with federal, state, and local governments, along with the private sector and the Washoe Tribe, are critical to this strategy. The EIP represents a significant tool for aiding the achievement and maintenance of adopted environmental quality standards for Lake Tahoe, and at the same time, supports the Region's economy. To date, over 500 projects and programs have been implemented or are in the planning stage.

The broad-based EIP was first generated by TRPA in 1995 and later highlighted at the 1997 Lake Tahoe Presidential Forum. The EIP was informed by the *Bi-State Compact*, the Threshold Standards established in 1982, and the more limited water quality capital improvements of the early 1990s. The Federal Partnership Agreement, signed during that Presidential Forum, committed participating federal departments and agencies to integrate appropriate federal programs and funds to help achieve the goals of the EIP. In August 1999, the Federal Partnership concluded that *"the EIP is a viable framework for guiding implementation of actions needed to attain the environmental thresholds for the Tahoe Basin."* Federal Interagency Partnership, California, Nevada, and The Washoe Tribe also agreed to work with TRPA to integrate appropriate programs and funds to achieve the goals of the EIP.⁷

From 1997 to 2010 a total of \$1.55 billion has been invested in 366 completed and 166 ongoing EIP projects from a combination of federal, state, local, and private sources (Figure 12-4). The EIP is administered and coordinated by TRPA, which is responsible for maintaining a master list of projects, programs, and studies from which priorities can be derived, and implementation plans prepared. TRPA is also responsible for developing a finance plan to implement and guide the EIP. EIP projects use capital investment to put environmental gain on the ground. By enhancing the Region's desirability as a destination and a livable community, EIP projects also result in primary and secondary job creation.

The regional partnership updated the EIP in 2008 to create more complete programs and better prioritization. Instead of a mere list of EIP projects, the EIP now concentrates on focus areas and program areas oriented to different threshold categories and standards. The following is an outline of the EIP focus areas and programs, and the Thresholds Standards they support:

- **Watershed, Habitat and Water Quality Focus Area**
 - *Stormwater Management Program* – primarily addresses Threshold Standards related to tributary, surface runoff, groundwater, littoral and pelagic water quality, and Lake Tahoe transparency and primary productivity

⁷ Memorandum of Agreement Between the Federal Interagency Partnership on the Lake Tahoe Ecosystem, The States of California and Nevada, The Washoe Tribe of Nevada and California, and The Tahoe Regional Planning Agency, July 26, 1997.

- *Watershed Management Program* – primarily addresses Threshold Standards related to deciduous, meadow, and wetland riparian vegetation, uncommon plant communities, habitats of special significance, stream habitat, stream environment zones and impervious coverage, tributary water quality, and scenic quality
- *Threatened, Endangered and Sensitive Species Program* – primarily addresses Threshold Standards related to special interest wildlife and fishes, uncommon plant communities, and rare plants
- *Invasive Species Program* – primarily addresses Threshold Standards related to lake and stream habitat conditions, water quality, recreation, and non-threshold socioeconomic issues
- **Forest Management**
 - *Forest Ecosystems and Hazardous Fuels Reduction Program* – primarily addresses Threshold Standards related to common vegetation and late seral and old forest ecosystems
- **Air Quality and Transportation**
 - *Air Quality and Transportation Program* – primarily addresses Threshold Standards related to ozone, particulate matter, carbon monoxide, nitrate deposition, oxides of nitrogen, and transportation corridor noise. Secondly, projects implemented under this program can improve stream habitat quality indicators by improving road crossings.
- **Recreation and Scenic Resources**
 - *Recreation Program* – primarily addresses Threshold Standards related to recreation quality and access to recreational opportunities
 - *Scenic Program* – primarily addresses Threshold Standards related to scenic resources
- **Applied Science Program**
 - *Monitoring Program* – supports the threshold-related monitoring
 - *Applied Research Program* – supports agency research needs
 - *Data and Information Management and Reporting Program* – supports threshold-related monitoring
- **Program Support**
 - *Program Support, Reporting and Technical Assistance Program* – supports technical assistance needs of the agency

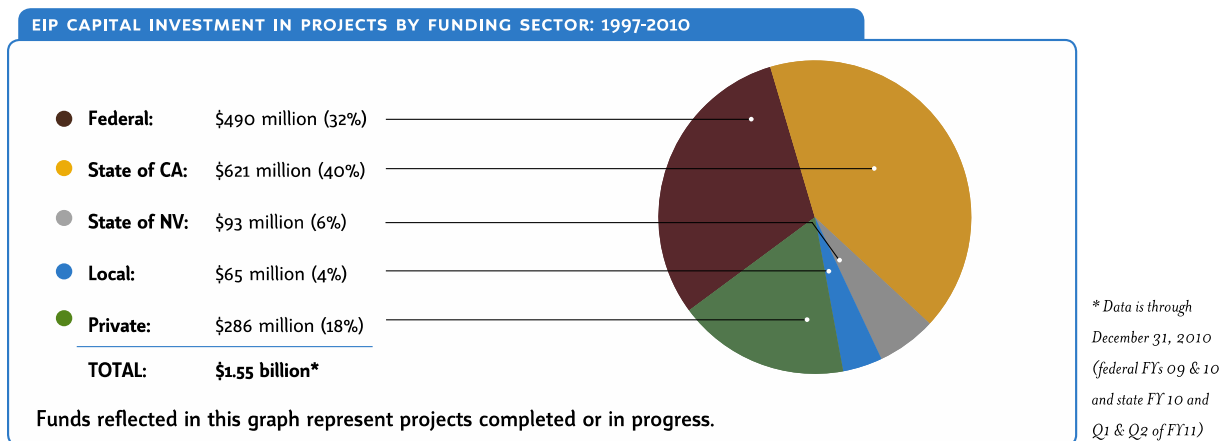


Figure 12-4. Distribution of funding contributions by federal, state, local and private partners to projects under the Environmental Improvement Program, 1997-2010.

Projects have been and are currently being implemented throughout the Lake Tahoe Basin. Historically, program areas of highest focus have been water quality, air quality and transportation, soil conservation, and vegetation. However, as part of the overall EIP strategy, the process for developing and implementing programs and projects was envisioned to be dynamic, as new information becomes available and conditions change. Recent challenges addressed by EIP projects include overstocked forests and the risk of catastrophic wildfires, terrestrial and aquatic invasive species, and the impacts of climate change as a major threat to the environment and economy of the Tahoe Basin.

The following provides highlights of projects implemented under the EIP between 2007 and 2010:

- **Watersheds, Habitat, and Water Quality**

Stormwater runoff from roads and urban areas, altered wetlands and streams, and inadequate stormwater pollution control has significantly impacted Lake Tahoe's famous clarity and the health of its watersheds. Much of this infrastructure was developed decades ago; however associated impacts are being expressed today. The EIP Watersheds, Habitat, and Water Quality program is effectively implementing projects to control erosion and treat stormwater from urban infrastructure, restore and enhance meadow and wetland habitats and control and prevent the introduction of invasive species.

Highlights of implemented watersheds, habitat, and water quality projects:

- Treated stormwater runoff on 501 miles of roadway
- Managed the installation of BMPs for 13,444 private properties to reduce stormwater runoff (see program summary in Appendix IE-3)
- Planned and completed 25 projects to help restore the Upper Truckee River watershed
- Completed restoration or enhancement to greater than 1,340 acres of riparian or stream zone habitat
- Since 2005, the acres of invasive aquatic weeds removed/year from the nearshore of Lake Tahoe has increased to nearly 8 acres in 2011 (Figure 12-5, see program summary in Appendix IE-4)

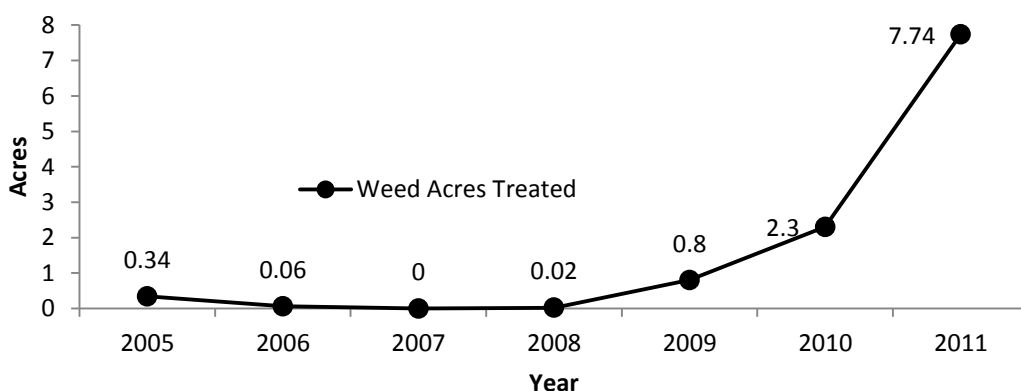


Figure 12-5: Acres of diver-assisted aquatic invasive weeds treated as part of the effort to control aquatic weeds in Lake Tahoe between 2005 and 2011. Treatment types included bottom barriers, which kill weeds in place, and removal by diver assisted suction. Note: native aquatic vegetation is not targeted in these actions.

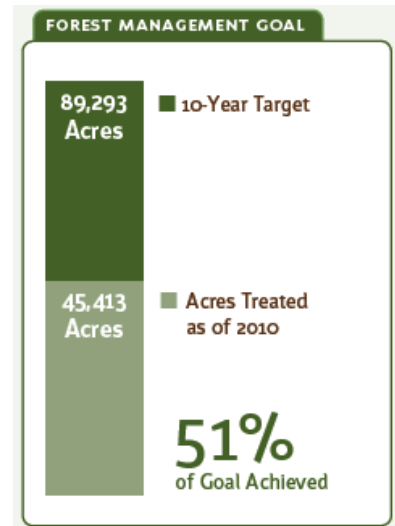
- Conducted mechanical removal of non-native fishes at 14 sites (beginning in 2011)
- Conducted a total of 7,667 full AIS inspections (in 2011, by the motorized watercraft inspection program). The number of decontaminations in the summer season dramatically increased from 1,200 in 2010 to 4,800 in 2011.

- **Forest Management**

After decades of fire suppression, the Tahoe Basin's overstocked forests are highly vulnerable to insect, disease, and catastrophic wildfire, and lack the diversity in species and age structure to support a healthy forest ecosystem. Forest management projects are essential to the safety of Tahoe's communities and the health of its forests.

Highlights of implemented forest management projects:

- Reduced forest fuels and enhanced forest health across 45,413 acres, nearest to urban development
- Inspected approximately 4,000 private properties for defensible space compliance in 2010

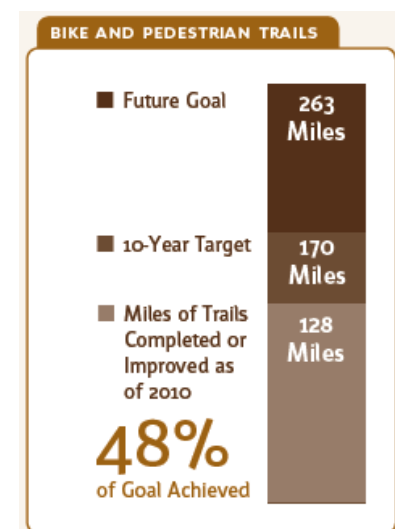


- **Air Quality and Transportation**

Visitors come to Lake Tahoe predominantly by automobile, which contributes to air pollution and impacts Lake Tahoe transparency. The EIP air quality and transportation projects aim to efficiently connect Tahoe's communities and reduce personal automobile use.

Highlights of implemented air quality and transportation projects:

- Acquired or in the process of acquiring high-efficiency street sweepers to significantly reduce particulate matter by local jurisdictions and state transportation departments. Street sweeping is also believed to reduce the amount of fine sediments entering Lake Tahoe.
- Continued to operate a seasonal transit service on the West Shore of Lake Tahoe to connect existing transit services on the North and South Shores
- Constructed or improved 128 miles of bike and pedestrian trails as of 2010

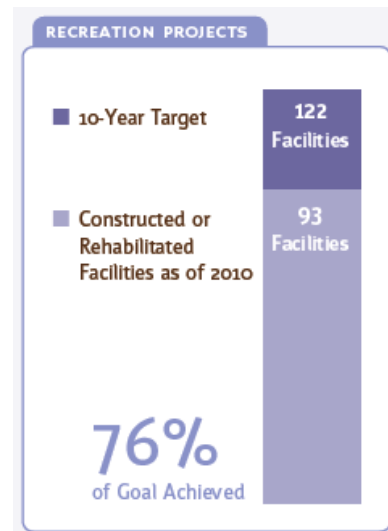


- **Recreation and Scenic Resources**

Public access and recreation are the foundation of the Basin's tourist based economy. To support Lake Tahoe's increased focus on ecotourism, these projects will help provide high-quality recreation experiences.

Highlights of implemented recreation and scenic resources projects:

- Completed the Tamarack Lodge at Heavenly Mountain Resort, which represents a high-quality outdoor recreation experience and an important public/private partnership
- Acquired 2,579 linear feet of shoreline for public access.
- Constructed or rehabilitated 93 recreation facilities as of 2010



- **Applied Science**

Activities carried out under the EIP Applied Science Program serve to inform the management, conservation, and restoration of the environment and natural resources. Using applied science to inform the EIP's adaptive management process, future projects will be prioritized to get the most environmentally beneficial projects on the ground, including: (1) integrating management actions across targeted resources, including air quality, water quality, soils and vegetation, and wildlife and fisheries; (2) improving coordination of monitoring, research, and ecological and hydrological modeling efforts; (3) better defining responsibilities and commitments among those contributing to adaptive management for data analysis, interpretation of study results, and the reporting of new information; and (4) identifying protocols to facilitate collaborative decision-making in resource management and environmental restoration, and in the updating of management strategies.

Highlights of implemented science projects:

- The establishment of the Tahoe Science Consortium (TSC) has been valuable in institutionalizing a stable science program for the Lake Tahoe Basin. The TSC has completed a science plan specific to Lake Tahoe (Hymanson and Callopy 2010) and established clear procedures for vetting science proposals that involve the science community, land managers, and regulators.
- Through grant funding from the Southern Nevada Public Lands Management Act, the federal government and Nevada has invested greater than \$18.7 million in applied research projects - for detailed summary of funded projects see van Huysen (2011).
- Improved scientific understanding of Asian clam management and eradication
- Funded necessary studies for the Lake Tahoe TMDL
- Initiated a TMDL management system to support efforts to implement the Lake Tahoe TMDL to restore Lake Tahoe's transparency
- Delivered state of the art LiDAR and Multispectral remote sensing data in 2010 that can be used to for a wide-variety of science investigations, monitoring applications and restoration project planning

- Developed updated status and trend monitoring program management system to guide implementation of future threshold-related monitoring, evaluation and reporting
- Drafted monitoring and evaluation plans and protocols in support of threshold-related monitoring
- Established a pilot web-based reporting platform to provide broad access to status and trend monitoring results

Implementation and Effectiveness of the TRPA Monitoring Program

Over the last 4 years TRPA has been improving the implementation and effectiveness of its threshold monitoring program known as the Tahoe Status and Trend Monitoring and Evaluation Program. TRPA has been working with the Tahoe Science Consortium, U.S. Forest Service, Lahontan Regional Water Quality Control Board, California Tahoe Conservancy, and Nevada Division of Environmental Protection to develop and implement a more rigorous, consistent, and structured management system (based on an adaptive management and continual improvement cycle) to guide the program's implementation (see also Sokulski and Beierle 2007). Included in the program is a planning element (plan), implementation element (do), reporting element (data evaluation and reporting) and adjustment element (act). The current focus of the program thus far has been on the planning and reporting elements. To date the program has drafted monitoring and evaluation plans for indicators related to:

- Pelagic Lake Tahoe
- Healthy Vegetation and Hazardous Fuels
- Biological Integrity of Stream Habitat
- Transportation Mode Split
- Impervious Surface and Land Cover
- Scenic Resources
- Special Interest Wildlife Species
- Visibility

The “pilot” implementation of these improved monitoring and reporting plans are currently being evaluated to ensure that the procedures contained within them are clearly articulated and will cost-effectively yield data applicable to appropriate Threshold Standards.

Additional monitoring and evaluation plans for other Threshold Standards are currently under development and will include procedures for tracking indicators related to:

- Nearshore Lake Tahoe – includes monitoring elements related to attached algae, aquatic invasive species and water transparency
- Upland Forest Habitat Condition – wildlife related indicators that will aid in the tracking biological dimension of forest health.
- Urban Stormwater
- Air Quality – Criteria Pollutants
- Wet Meadows

Future Threshold Evaluations will incorporate data resulting from these completed monitoring and evaluation plans.

With this report, TRPA is also introducing improved public access and availability of threshold-related monitoring data. A “pilot” web-based reporting platform now exists and can be accessed at www.tahoemonitoring.org. As the monitoring program continues to develop, additional content will be added to this website.

In 1982, by unanimous vote of the Governing Board, TRPA adopted Resolution 82-11, adopting Threshold Standards for the Tahoe Region based on what was at the time the best available science as well as certain pragmatic and political compromises in the application of that science to the Region. Since Threshold Standards were adopted, TRPA has occasionally amended Threshold Standards and has completed four Threshold Evaluations as prescribed in Resolution 82-11, TRPA (1986) and TRPA (1987) Chapter 32. This evaluation completes the fifth Threshold Evaluation. The TRPA monitoring program implements the reporting requirements outlined in the *Regional Plan* and Resolution 82-11. However, the effectiveness of the monitoring program to produce quality Threshold Evaluations (and other reporting products) sufficient to guide future policy direction has been hampered by several factors.

Monitoring requirements set forth in the *Regional Plan* decades ago are complex and burdensome, in addition to not being implementable in today’s reality of shrinking resources. The threshold monitoring requirement alone relies on the assessment and “attainment” determination of more than 150 indicators, organized across nine threshold categories. In addition to the complexities associated with threshold monitoring, the *Regional Plan* requires the Agency to monitor the effectiveness of each and every program, regulatory control, and on-the-ground action (known as “compliance measures”) contained in the *Regional Plan*. To the lay person, the threshold system is confusing and does not lend itself to direct conclusions about “attainment” or “non-attainment.”

Secondly, evaluation and reporting on the effectiveness of each compliance measure is beyond the capabilities of even the most well-funded and well-staffed agency. During the Pathway Planning process, the Basin Executives requested an analysis of what the monitoring program for assessing environmental progress would cost on an annual basis. According to a report issued at that time, the status & trend monitoring system alone, if implemented to its fullest extent, would cost about \$10 million a year, far greater than TRPA’s entire annual general fund revenue, and a sum that the multi-agency Basin partnership saw no possibility of funding on a consistent basis.

The Basin Executives collectively recommended a more implementable and feasible system be designed. A secondary study related to the Tahoe status and trend monitoring and evaluation program came back with an updated integrated program cost estimate of \$4 million per year, the State of California’s entire current budget contribution to TRPA’s general fund.

In TRPA’s Strategic Plan (TRPA, 2010), emphasis was placed on the measurement and monitoring elements of the *Bi-State Compact*, because this *Regional Plan* mandate had been severely underfunded, had not been well administered, and was too complex, onerous, and laden with non-informative measures.

In 2009, the TRPA Planning and Evaluation Department was reorganized to create an independent Measurement Department within the agency. With that reorganization, the Agency has focused on bringing increased scientific rigor, more consistent protocols, and a higher degree of legitimacy, as well as affordability, to this aspect of the *Bi-State Compact* mandate. That effort is ongoing—like everything else in today’s reality of shrinking resources, adhering to the past system, which is neither

fully affordable nor fully implementable, simply invites failure and ignores the “new normal” of today’s budgets and resources.

The TRPA monitoring program implements the reporting requirements outlined in the *Regional Plan* and Resolution 82-11. However, the effectiveness of the monitoring program to produce quality Threshold Evaluations (and other reporting products) sufficient to guide future policy direction has been hampered by several specific factors, including:

Interpretation of TRPA (1987) Chapter 32:

- **“Threshold Indicators”** - One of the primary purposes of Threshold Evaluations is to provide a meaningful characterization of the status of indicators relative to adopted Threshold Standards. The presentation of attainment status of Threshold Standards in past Threshold Evaluations has been inconsistent and confusing to many readers. Furthermore, the approach used to determine Threshold Standard status appears to be in conflict with direction provided in TRPA (1987) Chapter 16 which specifies a monitoring program that will “...*identify sufficient indicators for each threshold [standard] and [local, state and federal] standard so that, evaluated separately or in combination, the indicators will accurately measure, on a continuing basis, the status of attainment or maintenance of that threshold [standard] or [local, state or federal] standard, taking into account the impacts of both development in the Region and implementation of compliance measures. In monitoring and reporting on the status of indicators, as called for in this chapter, TRPA shall use the appropriate measurement standards [i.e., units of measure] for those indicators. TRPA shall use consistent measurement standards [i.e., units of measure] over time, so that reports will provide easily comparable data throughout the evaluation period.*” Past Threshold Evaluations have represented the status of Threshold Standards with 36 “threshold indicators.” In many instances these “threshold indicators” do not meet the Chapter 16 *Code of Ordinances* definition of an indicator⁸ but instead are an aggregation of the status of multiple indicators. In other cases, “threshold indicators” do adhere to the *Code of Ordinances* definition. As a consequence of aggregation, in past evaluation reports, if any indicator within a group of multiple indicators related to a “threshold indicator” at any time over the five year period failed to meet the indicator target or benchmark (i.e. Threshold Standard), the entire “threshold indicator” would be reported as “non-attainment.” This approach was applied inconsistently but generally skewed the conclusions to an overly conservative determination of attainment status, and failed to reveal the actual attainment status of individual Threshold Standards. The current Threshold Evaluation corrects this past flaw by reporting an indicator’s current status relative to the actual adopted standard as it appears in Resolution 82-11 as originally intended. Consequently, this approach is recommended and will be the method used in all future Threshold Evaluations to improve the consistency and effectiveness of communicating Threshold Standard attainment status determinations.
- **Interim Target and Target Dates** – A major reporting element of Threshold Evaluations is to provide an interim target and predict when a Threshold Standard will be achieved based on the actions that TRPA implements through the *Regional Plan*. These implemented actions are referred to by TRPA as “compliance measures.” “Interim targets” are defined as “...*a goal, expressed in terms of the applicable measurement standard [unit of measure], reflecting the status of a threshold or*

⁸ TRPA (1987, as amended in March of 2012) 16.3.3 Indicator: Any measurable physical phenomena within the Tahoe Region whose status, according to the best available scientific information, has a direct relationship to the status of attainment or maintenance of one or more threshold [standard] or [local, state or federal air and water quality] standard. (Example: traffic volume.)

standard which TRPA expects to achieve at a major evaluation interval specified for that threshold [standard] or [local, state, or federal air and water quality] standard." And a "target date" is defined as "a specific calendar date on which TRPA expects to attain a threshold [standard] or [local, state, or federal air and water quality] standard which is not now in attainment." Direction provided in Chapter 32 is clear that the agency must identify both target dates and interim targets.

Nonetheless there has never been a standardized approach set out until now to establish these benchmarks other than to take into account compliance measures, expected development, and evidence in the record. Past evaluations have identified the completion of research as an "interim target," which is clearly outside of the defined purpose of "interim targets." In this Threshold Evaluation, available trend data is relied upon as an objective basis on which to estimate both interim targets and target attainment dates. This approach, although fairly simplistic, provided a replicable method to fulfill the interim target and target attainment date reporting requirements. However, refinements will be needed if these reporting requirements are maintained. Future reporting efforts will need to include estimates of confidence around interim targets and target attainment dates to improve their scientific validity.

- **Compliance Measures** – As indicated above in the "Compliance Measure" section of this chapter, Chapter 16 of the *Code of Ordinances* established an infeasible, scientifically challenging, and unaffordable system for evaluating the contribution of compliance measures to threshold attainment status. Therefore, TRPA interprets Chapter 16 reasonably by providing a current description and list of actions currently being implemented. In further response, TRPA is modifying its Monitoring Program to develop conceptual models to map and document the most current understanding of factors and activities affecting the Region's ability to meet environmental goals (Appendix IE-2). This approach is a reasonable, cost-effective, and implementable approach to illustrate the role of compliance measures in achieving Threshold Standards.
- **Threshold Standards** - According to Resolution 82-11, Threshold Standards are to be reviewed at least every five years by the most appropriate means. After such review, the pertinent Threshold Standards are to be amended where the scientific evidence and technical information provide sufficient evidence to amend the standard. The possibility of updating Threshold Standards was acknowledged in the 2001 Threshold Evaluation and noted again in the 2006 Threshold Evaluation. Detailed technical review of Threshold Standards and indicators (Pathway Planning 2005), and recently released research (e.g., Taylor et al. 2004, Lahontan and NDEP 2010), also revealed opportunities to improve the suite of standards and indicators used to assess environmental conditions of the Lake Tahoe Region. Over the life of the *Regional Plan*, only seven Threshold Standards have been amended or updated over the last 24 years. In order to improve the effectiveness of Threshold Evaluations and their value for informing policy decisions, actions are recommended to amend, clarify, replace, and in some cases, remove Threshold Standards. These recommendations are highlighted in the Conclusions and Recommendations chapter of this report.

Cumulative Accounting of Regional Plan Activities

The *Code of Ordinances*, in Subsection 16.8.2, requires TRPA to maintain a current cumulative account of Regional planning activities for the purpose of assessing cumulative beneficial and negative environmental impacts of the *Regional Plan* and its role in moving the Tahoe Region toward achieving interim targets and Threshold Standards. The interim targets (according to Subsection 16.5 of the *Code of Ordinances*) identify major intervals for each Threshold Standard, and state and federal air and water quality standards are part of the threshold attainment schedules required in the Code.

The *Code of Ordinances* states that the cumulative account shall include at least the following items:

- I. Units of Use: Residential, commercial, tourist, and recreational allocations
- II. Resource Allocations: Additional vehicle miles traveled, vehicle trip ends, impervious coverage, water demand, sewage disposal capacity, area of stream environment zone (SEZ) disturbance
- III. Threshold Attainment and Maintenance: Value of investments in water quality, air quality, transportation and coverage mitigation programs; area of SEZ restoration

I. UNITS OF USE

RESIDENTIAL

Residential Allocations and Development Rights

Tahoe Regional Planning Agency regulates the rate and timing of new residential growth in the Region in accordance with Section 50.4 of the *Code of Ordinances*. It does this by issuing and distributing a limited number of residential allocations each year to local jurisdictions.

Every new residential unit of use requires one residential allocation⁹ and one residential development right.¹⁰ This requirement does not apply to affordable housing units,¹¹ which are exempt from allocation requirements. TRPA may substitute a residential bonus unit¹² with a residential development right for new affordable and moderate-income housing units from a pool of bonus units created for this purpose.^{13, 14} A maximum of 200 residential allocations may be assigned (reserved) in the Region for moderate income housing¹⁵ for jurisdictions with a TRPA approved Moderate Income Housing Program (MIHP).¹⁶

Residential allocations allow recipients to apply for new residential units of use, but do not constitute a right or entitlement to develop a project. The *Code of Ordinances* also allows allocation transfers from non-buildable to buildable lots under certain conditions. Applicants for new development must demonstrate that their project conforms to the development and use standards of the *Regional Plan*, including, but not limited to, residential density limits before their projects can be approved.

Residential allocations are considered “used” when an application is made for new residential development and are not re-allocated (re-used) if a project is not approvable or if a permit for an approved project expires. Residential allocation uses in the Region for the 2006-2010 reporting period are summarized in Table 12-1a, below.

The numbers of allocations distributed to local jurisdictions from January 1, 2006, through December 31, 2008, are described in Subsection 50.4 of the *Code of Ordinances*. No new allocations were issued in 2009 and 2010, and the only allocations available were roll-overs from previous years.¹⁷ Beginning on January 1, 2009, and until adoption of the *Regional Plan* update, local jurisdictions could elect to

⁹ Defined in Chapter 50, Code of Ordinances

¹⁰ Defined in Chapter 31, Code of Ordinances

¹¹ Defined in Chapter 90, Code of Ordinances

¹² Defined in Chapter 52, Code of Ordinances

¹³ This pool had 1,400 residential bonus units assigned to it when it was created in July 1987

¹⁴ See Subparagraph 52.3, Code of Ordinances

¹⁵ Defined in Chapter 90, Code of Ordinances

¹⁶ See Subparagraph 50.4, Code of Ordinances

¹⁷ See Subparagraph 50.4, Code of Ordinances

retain (carry-over) unused allocations, including unused 2008 allocations, into the following calendar year.

TRPA defines a “development right” as the right to potential residential use, which is attached to certain parcels in the Region in accordance with TRPA (1987) Section 21.6. According to Section 21.6, development rights are assigned and utilized on parcels that existed prior to July 1, 1987 with several exceptions. Table 12-1b describes the historic and current status of development rights utilized by TRPA as of 2011. When the *Regional Plan* was adopted, 37,701 development rights had been utilized. Over the course of the *Regional Plan*’s implementation, a total of 8,512 development rights were retired through land acquisition programs and 6,085 were utilized. A total of 4,091 development rights remain, however because of *Regional Plan* land use restrictions, only about 87 percent (or 3,556 parcels) of the development rights have the potential of being utilized in the future.

Table 12-1a. Residential Allocations

Jurisdiction	See Note a		See Note b		See Note c
	2006	2007	2008		2009 & 2010
Douglas Co.	13 (0)	14 (4)	14 (0)		15
Washoe Co.	31 (23)	31 (13)	37 (29)		40
El Dorado Co.	83 (6)	76 (5)	76 (27)		69
City of SLT	35 (0)	29 (0)	35 (3)		32
Placer Co.	50 (7)	50 (15)	50 (39)		50
Total	212 (36)	200 (37)	212 (98)		206

Notes:

- Numbers in parenthesis represent the number of allocations that were unused in the identified year and added to the TRPA residential “allocation pool.”
- Numbers in parenthesis represent the number of allocations that were unused in 2008 and carried-over for use in the following years.
- No new residential allocations were issued by TRPA in 2009 and 2010. Numbers represent unused allocations carried-over from 2008.

Source: TRPA Governing Board reports and minutes, and annual TRPA residential performance audits.

Table 12-1b. Development Right Utilization Summary

Pre-1987 Developed Parcels ¹	40,865
Total Development Rights 1987 ²	18,690
Total Development Rights Retired ³	8,512
Total Development Rights Developed or Allocated to Jurisdictions ⁴	6,087
Total Development Rights Remaining ⁵	4,091
Buildable Lots ⁶	2,791
Currently Not Developable ⁷	765
Unbuildable Lots ⁸	535

1. Total developed parcels is based on the 2010 Census Enumeration minus the total rights developed/allocated in the 1987 Regional Plan.

2. Total development rights is the sum of all development rights retired, development rights developed or allocated and total development rights remaining.

3. Total development rights retired is the sum of all parcels retired by the California Tahoe Conservancy, Nevada State Lands Division and parcels purchased by the USFS with Burton-Santini funds.
4. Total development rights developed or allocated in the <i>Regional Plan</i> tracked and adjusted for years 2010 and 2011 by TRPA in the "Residential Allocation Accounting 1987 Through 2009."
5. Total development rights remaining is the sum of all private legally existing vacant parcels on the effective date of the 1987 Regional Plan, July 1, 1987 as defined by <i>Code of Ordinances</i> , Section 50.3. This total includes all vacant IPES parcels and Bailey parcels classified as SEZ (1b) or sensitive (1a, 1c, 2 or 3). Currently 951 vacant Bailey parcels classified as non-sensitive (4, 5, 6, or 7) also remains; however, they do not have development rights associated with them.
6. Buildable lots are defined as the sum of all vacant parcels with an IPES score of 726 or greater in Placer County, vacant parcels with IPES scores greater than 1 in Washoe, Douglas and El Dorado County.
7. Marginal lots are defined as the sum of all vacant parcels with an IPES score less than 725 in Placer County.
8. Unbuildable lots are defined as the sum of all vacant parcels with an IPES score of 0.

Residential Allocation Pool

From 1987 through the last day of 2007, unused allocations were assigned to a residential allocation pool for redistribution by TRPA. By December 31, 2010, this pool had been drawn-down to 86 allocations.¹⁸

Residential Allocation Transfers

Residential Allocations may be transferred from one property to another in accordance with provisions in Chapters 50 and 51 of the *Code of Ordinances*. Table 12-2, below, summarizes the total number of residential allocation transfers for the five-year reporting period.

Table 12-2. Residential Allocation Transfers					
Jurisdiction	2006	2007	2008	2009	2010
Douglas	0	0	0	0	0
Washoe	0	0	0	0	0
El Dorado	0	0	0	2	0
City of SLT	0	0	0	0	0
Placer	0	0	3	0	0
Total	0	0	3	2	0
<i>Source: TRPA Project Action Data Base (Accela)</i>					

¹⁸ Source: TRPA Governing Board reports and minutes, and annual TRPA residential performance audits.

Residential Bonus Units

Multi-residential bonus units may be assigned to new affordable or moderate-income housing units, or substituted for a residential development right in “market-rate” developments in accordance with Chapters 50 and 52 of the *Code of Ordinances*. Chapter 52 contains provisions to “earn” development rights.¹⁹ TRPA assigns bonus units to a TRPA bonus unit pool and to certain approved community plans in the Region.

As indicated in Table 12-3, below, TRPA assigned 167 bonus units to residential projects from January 1, 2006 through December 31, 2010. In addition, 188 bonus units were administratively “reserved” for future use in accordance with the TRPA Community Enhancement Program (CEP) pursuant to TRPA “special project” provisions of Subparagraph 50.5 of the *Code of Ordinances*. Of the 188 “reserved” units, a total of 44 bonus units have been permitted and built.

Table 12-3. Residential Bonus Units			
Balances, Assignments and Reservations	Assigned to TRPA Bonus Unit Pool	Assigned to Community Plans	Total
Balance on January 1, 2006	636	405	1,041
Assigned to Projects (1/1/06 through 12/31/10)	111	56	167
Balance on December 31, 2010	525²⁰	349	874
<u>Source:</u> TRPA Residential Bonus Unit Accounting Data			

COMMERCIAL

The Tahoe Regional Planning Agency regulates the rate and timing of new commercial growth in the Lake Tahoe Region. It does this by issuing and distributing a limited square footage of commercial floor area (CFA) to local jurisdictions in accordance with Section 50.5 of the *Code of Ordinances*. Additional CFA requiring an allocation is defined in Subparagraph 50.5 of the *Code of Ordinances*.

Small commercial additions (500 square feet or five percent of existing commercial floor area, whichever is less), transfers of CFA, and new CFA obtained through “elections of conversion of use,”²¹ are exempt from TRPA allocation requirements. Commercial allocations allow recipients to apply for new CFA, but do not constitute a right or entitlement to develop a project. CFA which has been allocated to a project, but for which a permit has been allowed to expire, is returned to TRPA CFA allocation pools.

The City of South Lake Tahoe is delegated authority to allocate CFA within its jurisdiction through a memorandum of understanding (MOU) with TRPA.²² All other allocation approvals in the Region must be reviewed and approved by TRPA following a positive recommendation by the affected local jurisdiction.

¹⁹ See Subsection 52.3 *Code of Ordinances*.

²⁰ A total of 144 bonus units are “reserved” for CEP projects and are accounted for in the total balance remaining.

²¹ Subsection 50.9, *Code of Ordinances*

²² Table 2.6-1, Chapter 2, *Code of Ordinances*

Commercial floor area allocations from 2006 through 2010 are summarized by jurisdiction in Table 12-4, below.

Table 12-4. Commercial Floor Area (CFA) Allocations ^{1, 2} (in square feet)					
Jurisdiction	2006	2007	2008	2009	2010
Douglas	0	0	0	0	0
Washoe	0	0	0	0	0
El Dorado	0	0	0	0	0
City of SLT	8,173	13,180	0	0	0
Placer	0	0	0	1,875 ³	0
Total	8,173	13,180	0	1,875	0

Notes:

1. Does not include minor CFA additions per Subparagraph 50.5, *Code of Ordinances*.
2. Only CFA associated with project approvals are reported. Allocations of CFA to projects with expired permits are returned to TRPA allocation pools.
3. This amount of CFA is associated with a commercial modification violation (a commercial addition constructed by a property owner without a TRPA permit). TRPA records indicate that the violation was resolved by the Agency, and a TRPA permit was issued after the fact, but the permit did not require a CFA allocation or transfer as would normally be required for a commercial expansion project.

Source: TRPA Environmental Review Services Branch daily project action logs, project application files, and City of South Lake Tahoe accounting records.

Tourist Accommodation Units

New tourist accommodation units (TAU) are regulated in accordance with Subsection 50.6 of the *Code of Ordinances*. Transferred TAUs, or new TAUs resulting from an "election of conversion of use"²³ do not require an allocation or a TAU "bonus unit." From January 1, 2006 through December 31, 2010, no TAUs or TAU bonus units were approved by TRPA; however, TRPA assigned a total of 90 units to CEP projects. In December 2000, the TRPA Special Project TAU allocation pool had 172 units remaining and the Community Plan TAU allocation pool has 170 units remaining.²⁴ No allocations have been drawn from this pool since December 2000.

Recreational Allocations

TRPA regulates the rate and distribution of new recreation facilities in the Region by issuing PAOTs, which are defined as "people at one time," or the number of people that a recreation use can accommodate at one time, as a measure of recreation capacity.²⁵ PAOTs are assigned to "summer day use," "winter day use," and "overnight use" categories. TRPA allocated a total of 974 PAOTs to

²³ Subsection 50.9, *Code of Ordinances*

²⁴ See Subsection 50.6, *Code of Ordinances*

²⁵ Chapter 90 definitions and Section 50.8, *Code of Ordinances*

Heavenly Ski Resort (under lease with USFS-LTBMU), 81 PAOTs to Tahoe City Marina, and 107 to El Dorado Beach during the reporting period (Table 12-5).²⁶

Table 12-5. Recreation Allocations in Persons At One Time (PAOTS)					
Jurisdiction	2006	2007	2008	2009	2010
All Jurisdictions	0	974	81	107	0
<i>Source: TRPA Environmental Review Services Branch daily project action logs, PAOT Tracking Sheet and TRPA Accela Data.</i>					

II. RESOURCE UTILIZATION

ADDITIONAL VEHICLE MILES TRAVELED AND VEHICLE TRIP ENDS

TRPA measures changes in highway traffic by measuring vehicle miles traveled (VMT) and daily vehicle trip ends (DVTE). VMT represents total vehicle miles traveled in miles within the Lake Tahoe Region. One DVTE is counted each time a vehicle crosses a property line.

As Table 12-6 indicates, VMT and DVTE each decreased during the five-year reporting period. This may be due to a declining local population and the economic effects of the “great recession” since improvements to public transportation were relatively limited when compared to projects that occurred in the previous reporting period (e.g., Heavenly Gondola Project).

Table 12-6. Change (Δ) in Daily Vehicle Trip Ends (DVTE) and Vehicle Miles Travelled (VMT)						
Jurisdiction	2006	2007	2008	2009	2010	Total Δ by Jurisdiction
Douglas						
DVTE	- 12,530	- 4,760	- 2,980	0	800	- 19,470
VMT	- 50,120	- 19,040	- 11,920	0	3,200	- 77,880
Washoe						
DVTE	- 66	- 327	- 1,073	- 200	0	- 1,666
VMT	- 333	- 1,651	- 5,418	- 1,010	0	- 8,412
El Dorado						
DVTE	- 1,100	- 800	- 3,700	- 400	- 1,500	- 7,500
VMT	- 5,555	- 4,040	- 18,685	- 2,020	- 7,575	- 37,875
Placer						
DVTE	- 4,200	200	3,700	- 700	- 800	- 1,800
VMT	- 21,210	1,010	18,685	- 3535	- 4,040	- 9,090
Annual Δ						
DVTE	- 17,896	- 5,687	- 4,053	- 1,300	- 1,500	- 30,436
VMT	- 77,218	- 23,721	- 17,338	- 6,565	- 8,415	- 133,257
<i>Note: The increase or decrease in daily vehicle trip ends (DVTE) is based on traffic counts collected by Caltrans and NDOT, and divided by the average DVTE. Vehicle Miles Traveled (VMT) is calculated</i>						

²⁶ TRPA Environmental Review Services Branch daily project action logs, PAOT Tracking Sheet and TRPA Accela data.

assuming an average trip length per vehicle trip. TRPA calculates average trip length using survey data and modeling.

Source: Caltrans and NDOT Annual Traffic Count Programs

IMPERVIOUS LAND COVERAGE

Additional impervious land coverage for the 2006-2010 reporting period is shown in Table 12-7. New land coverage in this table was calculated using water quality mitigation fees collected for TRPA approved projects, including projects approved by local jurisdictions through delegation memoranda of understanding. From January 1, 2006, through November 25, 2007, the water quality mitigation fee required in Chapter 60 of the *Code of Ordinances* was equal to \$1.54 per square foot of new land coverage created. On November 26, 2007, this fee was increased to \$1.87 per square foot. In calculating new land coverage for 2007 (not separated-out in Table 12-7), the water quality mitigation fees collected by TRPA were pro-rated at \$1.57 per square foot. This pro-rating allows an estimate of new land coverage created in that year.

New land coverage is different from “transferred” and “relocated” land coverage, which are not considered “new” by definition in the *Code of Ordinances* and are not reflected in Table 12-7 for this reason. Similarly, Table 12-7 does not account for decreases in land coverage that have occurred due to coverage removal for “banking” purposes; nor does the table reflect decreases in land coverage that occurred pursuant to TRPA’s “excess land coverage mitigation” programs in Chapter 20 of the *Code of Ordinances*. “Land Coverage” is defined in Chapter 2 of the *Code of Ordinances* and in the 208 Plan for Lake Tahoe.

As Table 12-7 indicates, there was a significant decrease in the amount of new land coverage created from 2006-2010 compared to 2001-2005 totals (only 52 percent). This decrease is likely related to changes in the economy resulting from the “great recession,” and a decrease in developable vacant land in the Region as it approaches “build-out.”

Table 12-7. New Impervious Land Coverage by Evaluation Period

Jurisdiction	1991-1995		1996-2000		2001-2005		2006-2010	
	Square Feet	Acres	Square Feet	Acres	Square Feet	Acres	Square Feet	Acres
Douglas	306,396	7.03	262,116	6.06	283,505	6.51	149,438	3.43
Washoe	1,295,005	29.73	739,791	16.98	685,340	15.70	243,336	5.59
El Dorado	1,399,704	32.13	1,758,560	40.37	2,008,447	46.11	1,222,479	28.06
Placer	1,109,462	25.47	1,250,049	28.70	1,526,848	35.05	666,790	15.31
Total	4,110,567	94.37	4,002,017	91.87	4,504,140	103.42	2,182,042	52.39

Sources: 2001 and 2006 TRPA Threshold Evaluations and Water Quality Mitigation Fee collection data from TRPA Finance Department (for 2006-2010).

Total new land coverage created from 1991 through the end of 2010, equaled 14,798,766 square feet, or 339.7 acres. This figure does not account for reductions of land coverage for environmental restoration projects or excess land coverage mitigation (pursuant to Chapter 30 of the *Code of Ordinances*). As Table 12-11 below, indicates, about 1,348 acres (546 acres within the TRPA urban boundary) of stream environment zone (SEZ) land coverage and disturbance in the Region were restored from 1980 through 2010, more than offsetting the total amount of new land coverage created from 1991 through 2010.

WATER DEMAND

Potable water in the Lake Tahoe Region is pumped, treated, and delivered by nearly 60 public and private water purveyors and numerous private sources (Table 12-8). Although some of these purveyors have been purchased, the original water systems have been maintained or improved over time. All water is drawn from ground and surface waters in the Region in accordance with state and federal water rights law, and no water is imported into the Lake Tahoe Region from outside sources.

Table 12-8. Municipal Water Districts and Systems in the Lake Tahoe Basin	
Zone A (North Tahoe)	
Fulton Water Company Links System Cedar Flat System Agate Bay Water Co. Miscellaneous Domestic Water Systems	North Tahoe PUD Dollar Cove System Carnelian System Tahoe Marina/Estates Tahoe Vista, Kings Beach, Brockway System
Zone B (Tahoe City-West Shore)	
Tahoe City PUD Dollar Point Tahoe City Rubicon Properties Alpine Peaks McKinney Shores Rubicon Palisades/Tahoe Hills Fulton Water Company-Panorama Lake Forest Tahoe Sierra Estates Timberland Skyland Glenridge Lakeview Water Co. Lake Park Terrace Tahoe Park Tahoe Park Heights	Talmont Estates Ward Creek Ward Well Tahoe Pines Tahoe Swiss Village Madden Creek Quail Lake McKinney Water District Tahoma Meadows Tahoe Cedars Water's Edge Condominiums Meeks Bay Vista Tamarack Miscellaneous and private water systems State Parks U.S. Forest Service
Zone C (South Tahoe)	
South Tahoe PUD Service Area Lakeside Service Area Tahoe Keys Service Area Lukins Service Area Angora Service Area (now owned by So. Tahoe PUD)	TPW&G Service Area (now owned by So. Tahoe PUD) N. Fallen Leaf Lake Area S. Fallen Leaf Lake Area Echo Lake Area Miscellaneous private users
Zone D (Douglas County)	
Kingsbury Water Co. Edgewood Water Co. Round Hill General Improvement District Elk Point County Club U.S. Forest Service, Nevada Beach Camp Galilee Presbyterian Conference Point	Skyland Water Company Eickmeyer Water Company Snug Harbor Water Company Zephyr Cove Schools Zephyr Cove Fire Stations Cave Rock Water Company Logan Creek Water Company

Zephyr Cove Water Co. Zephyr Cove Lodge	Glenbrook Co. S. Tahoe Properties Utility Co.
Zone E (Washoe County)	
Nevada State Park, Sand Harbor Incline Village General Improvement District	Crystal Bay Water Co. Incline Beach Assn.
Carson City	
None	
<i>Source: California State Water Resources Control Board, 1979</i>	

About 54 percent of Lake Tahoe Region residents obtain their drinking water from Lake Tahoe,²⁷ either from private intake lines or from a public utility district system. Eleven of these utility districts are represented by the Tahoe Water Suppliers Association (TWSA), which publishes an annual report summarizing the Association's drinking water activities in the Region. These activities include, but are not limited to, monitoring of water supplies, identifying sources of water pollution, and activities to protect and improve water sources.

Water rights in the Lake Tahoe Region will soon be controlled by the Truckee River Operating Agreement (TROA), which was signed on September 6, 2008, and will go into effect no later than December 2014, unless the deadline is revised.²⁸ TROA is intended to formalize, regulate and monitor water rights and water use in the Tahoe Region, the Truckee River watershed, and the final outflow areas of Pyramid Lake and the Carson River in Nevada. Under TROA, total water extractions in the Tahoe Region are capped at 34,000 acre feet per year, limited by each state as follows:

California:	23,000 acre feet per year
Nevada:	11,000 acre feet per year

Water exports from the Lake Tahoe Region include transfers of treated sewage plus water drawn from Echo Lakes at the southern end of the Tahoe Region by the El Dorado Irrigation District (EID). EID holds an 1856 "priority water right" for a maximum of 30 cubic feet per second of water from Echo Lakes for a maximum of 1,943 acre feet of water per year (equal to 633,128,493 gallons per year or enough water to cover 3.036 square miles of land to a depth of one foot.) Water from Lower Echo Lake is gravity fed through a diversion pipe to the South Fork of the American River near Echo Summit for downstream use in California. EID does not always draw its full allotment of water from year to year, especially after wet winters when water demand is low.²⁹

New water demand in the Lake Tahoe Region occurs primarily from increases in residential development, the largest land use in the Region.³⁰ Estimated new water demand from residential development during the reporting period is summarized in Table 12-9, below.

Table 12-9. Estimated Water Demand¹

New Residential Units Approved 2006 through 2010 ²	Mean Water Use in Gallons Per Residential Unit Per Year ³	Estimated Water Use in Gallons for All Jurisdictions Per Year	Estimated Water Use in Acre Feet for All Jurisdictions Per Year ⁴

²⁷ Source: Tahoe Water Suppliers Association (TWSA) website, July 2011; <http://www.tahoeh2o.org>

²⁸ Source: Page 19, TWSA 2010 Annual Report

²⁹ Source: Cindy Megerdigian, El Dorado Irrigation District (EID)

³⁰ Source: Ross Johnson, South Tahoe Public Utility District (STPUD)

573	78,000	44,694,000	137.16
<p><u>Notes:</u></p> <p>1. Based on new residential allocations issued from 2006 through 2010.</p> <p>2. Assumes that all residential allocations assigned to local jurisdictions (per Table 1, above) resulted in completion of a new residence during the reporting period. Actual water use may be less than reported in this table for uncompleted, delayed, or expired construction.</p> <p>3. Per South Tahoe Public Utility District data, 2010.</p> <p>4. One acre foot of water equals 325,851 gallons.</p>			

Water demand in the Lake Tahoe Region varies year to year due to changes in resident and/or visitor populations, length of summer growing seasons (for outdoor irrigation), and drought conditions (which can lead to local water restrictions imposed by local utility districts). Droughts can also lead EID to exercise its full water rights and increase water exports out of the Tahoe Basin to the American River watershed.³¹

Water conservation is encouraged by many Lake Tahoe water purveyors. The South Tahoe Public Utility District (STPUD), for example, implemented a lawn turf buy-back program that saved an estimated 1,444,927 gallons of water per year in 2008 and 2009. STPUD also implemented a high efficiency clothes washer retrofit water savings program in 2010 that resulted in a water savings of 2,543,736 gallons of water per year.³²

SEWAGE DISPOSAL

The Porter-Cologne Act in California, and an executive order by the Governor of Nevada dated January 27, 1971, prohibit discharges of domestic, municipal or industrial wastewaters to Lake Tahoe, its tributaries, groundwater, or the portion of the Truckee River within the Tahoe Region.³³ As a result, Tahoe Region wastewater is generally collected, treated, and discharged to locations outside of the Region in one of the following four sewer export systems:

1. South Tahoe Public Utility District – Wastewater for the City of South Lake Tahoe and unincorporated portions of El Dorado County (south of Emerald Bay) is exported to Alpine County, California, via a sewer export line over Luther Pass (California State Route 89).
2. Douglas County Sewer Improvement District – Wastewater for Douglas County is exported to the Carson Valley in Nevada, via a sewer export line over Daggett Pass (Nevada State Route 207, Kingsbury Grade).
3. Incline Village General Improvement District – Wastewater for Washoe County is exported to the Carson City/Stewart area, Nevada, via a sewer export line over Spooner Summit (U.S. Highway 50).
4. Tahoe City and North Tahoe Public Utility Districts – Wastewater for Placer County and the portion of El Dorado County north of Emerald Bay is exported to the town of Truckee, California, via a sewer export line in the Truckee River Canyon (along California State Route 89).

³¹ Sources: Communications with EID, Incline Village General Improvement District, and STPUD

³² Source: Sarah Jones, STPUD Water Conservation Specialist, November 2011

³³ See Subparagraph 33.4.2, Code of Ordinances

Exceptions may be granted to discharges under alternative plans (for wastewater disposal authorized by state law, and approved by a state agency with appropriate jurisdiction). TRPA may also approve sewage holding tanks or other no-discharge systems in accordance with Subparagraph 33.2 of the *TRPA Code of Ordinances* as a temporary measure, or as a permanent measure in remote public or private recreation sites, where a sewer system would create excessive adverse environmental impacts.

The California Water Quality Control Board, Lahontan Region, has authority to issue wastewater discharge waivers in the California portion of the Lake Tahoe Basin. In Nevada, this authority is given to the Nevada Department of Environmental Protection (NDEP). Exceptions have been given to cabins in remote summer home tracts on the California side of the Region (including Upper and Lower Echo Lakes, Fallen Leaf Lake, Lily Lake, Glen Alpine, and Emerald Bay). Some summer homes are allowed to discharge “gray water” to leach field systems, but are also required to contain and transport “black water” sewage to an approved sewer dump station for treatment in a sewer plant.

There are five sewer treatment plants located in the Tahoe Region, each of which export treated sewage into one of the four export lines noted above. Existing sewage capacity for these plants, including “reserved” capacity, is summarized in Table 12-10, below. As the table indicates, none of the five Tahoe sewer treatment plants are near their total capacity. In discussions with sewer plant officials, all five sewer plants were originally designed for a much larger population than currently expected at Lake Tahoe. Excess plant capacity is a result of a number of factors, including TRPA growth controls and localized population decreases, combined with water conservation efforts, and public purchases of environmentally sensitive lands.

Table 12-10. 2010 Sewage Disposal Capacity in Millions of Gallons per Day (MGD)			
Sewer Collection District	Approximate 2010 Peak Sewer Flow	Approximate Capacity ¹	Approximate Reserve Capacity
North Tahoe PUD	0.83 ³	6.00	5.17
Tahoe City PUD ²	1.60	7.80	6.20
South Tahoe PUD	4.73	7.70	2.97
Incline Village GID	1.80	3.00	1.20
Douglas County SID	1.46	3.75	2.29
<p>Notes:</p> <ol style="list-style-type: none"> 1. The North Tahoe and Tahoe City Public Utility Districts share a common North Shore sewer export line to Truckee, where sewage is combined with four other sewer collection districts for treatment by the Tahoe-Truckee Sanitation Agency (T-TSA). Sewer plant capacity for NTPUD and TCPUD is, therefore, a factor of export line capacity and total capacity of the T-TSA treatment facility (9.60 million gallons per day). 2. TCPUD's sewer collection is split between a North Shore and a West Shore collection system. TCPUD's portion of the shared TCPUD-NTPUD North Shore export line has a capacity of 3.5 MGD. TCPUD's West Shore collection system has a capacity of 4.3 MGD, and is "fixed" by pumping capacity at their Sunnyside pump station. 3. Equals 2010 average sewer flow. A peak flow estimate was not available from NTPUD. <p><i>Source: Tahoe Region Sewer Districts</i></p>			

AREA OF SEZ DISTURBANCE

Stream Environment Zones (SEZ) are defined in Chapter 90 of the *Code of Ordinances* and include marshes and meadows, which are critical "filters" for water flowing into Lake Tahoe. Significant SEZ disturbance, especially in urbanized areas close to Lake Tahoe, is allowing sediments and nutrients to flow into the Lake above natural levels, and is contributing to water quality decline.

Since the mid-1900s, about 75 percent of marshes and 50 percent of meadows have been degraded from their natural condition, including the loss of 25 percent of the Region's marshlands associated with the development of the Tahoe Keys subdivision in the 1950s and 1960s.³⁴ In 1983, TRPA estimated that there were 17,718 acres of SEZ at Lake Tahoe and that 2,466 acres were built on or disturbed in some manner.³⁵ A more contemporary estimate of total SEZ acres in the Basin is 21,944 based on mapping conducted in the late 1990s (TRPA 2001).

The *Regional Plan* places high value on SEZ protection, and contains regulations and incentives for SEZ protection and restoration. Approximately 1,347 acres of SEZ were restored or enhanced in the Lake Tahoe basin from 1980 through 2011, of which 546 acres is counted toward the urban area management target of 1,100 acres (Table 12-11).

³⁴ *Lake Tahoe Watershed Assessment, USDA Forest Service, 2000*

³⁵ *Environmental Impact Statement for Adoption of a Regional Plan for the Lake Tahoe Basin, Tahoe Regional Planning Agency, February 1983*

Table 12-11. Stream Environment Zone Restoration (in Acres) 1980 to 2011			
	Within or Adjacent to Disturbed, Developed or Subdivided Areas	Within Undeveloped, Un-subdivided Areas	Total
Acres of SEZ Restored	546	83.5	629.3
Acres of Vegetation Enhancement in SEZ	23	695	718
Total Acres	569	778.5	1,347.3

III. THRESHOLD ATTAINMENT AND MAINTENANCE: VALUE OF INVESTMENTS IN WATER QUALITY, AIR QUALITY, TRANSPORTATION, AND COVERAGE MITIGATION PROGRAMS

Subparagraph 16.8 of the *Code of Ordinances* requires the Agency to report the value of investments in water quality, air quality, transportation, coverage mitigation programs, and the area of stream environment zone (SEZ) restoration. To satisfy this requirement, TRPA publishes, as part of its five-year Threshold Evaluation, annual expenditures and obligations by the Agency for projects funded from various mitigation funds maintained for this purpose.

TRPA may collect mitigation fees for projects approved by the Agency or one of its partners (through memoranda of understanding) in place of physical mitigation incorporated into approved projects. Priority for release of “in-lieu” mitigation funds is given to restoration projects or capital improvement needs listed in the TRPA Environmental Improvement Program (EIP) in accordance with Subparagraph 15.5 of the *Code of Ordinances*. Funding priority is granted to TRPA shorezone, water quality, traffic and air quality, excess land coverage, and rental car mitigation programs. Total TRPA expenditures and funding obligations for TRPA mitigation funds are summarized in Table 12-12, below.

Table 12-12. TRPA Capital Improvement Expenditures (in Dollars) ^{Note}		
TRPA Trust Fund Account	Expenditures & Obligations July 1, 2005 through June 30, 2010	Account Balance June 30, 2010
Water Quality Mitigation	4,642,979	1,884,850
Stream Zone Restoration Program	1,292,095	1,597,897
Air Quality Mitigation	3,470,662	2,024,101
Excess & Offsite Land Coverage Mitigation	2,925,250	10,918,318
Total	12,330,986	16,425,166
<p><i>Note:</i> This information is being reported in accordance with Subparagraph 16.8 of the Code of Ordinances.</p> <p><i>Source:</i> TRPA Mitigation fund accounting records.</p>		

WATER QUALITY MITIGATION FUNDS

The TRPA Water Quality Mitigation Fund is established in Subparagraph 60.2.3 of the *Code of Ordinances* as an in-lieu mitigation fund. In-lieu mitigation allows applicants to pay into a fund instead of constructing improvements on their project site. These funds are subsequently distributed to local jurisdictions and used to implement water quality improvements or Stream Environment Zone (SEZ) projects offsite, as a condition of project approval pursuant to the *Code of Ordinances* Subparagraph 61.2.3. Funds are tracked for each local jurisdiction and distributed to projects that are consistent with TRPA's Water Quality Management Plan (prepared in accordance with Section 208 of the Federal Clean Water Act). Accrued interest from this fund may be used for water quality improvement projects or water quality planning purposes (Subsection 60.2.8, *Code of Ordinances*).

At least 25 percent of Water Quality Mitigation Funds must be used for stream restoration projects included in the TRPA Water Quality Management Plan (Subsection 60.2.9 of the *Code of Ordinances*), and deposited into a Stream Restoration Program Fund. The jurisdictional set-aside requirements of Subsection 60.2.9 of the *Code of Ordinances* may be waived for this fund if TRPA determines that there are no SEZ-restoration projects left to complete within a jurisdiction.

Subsection 60.2.10 of the *Code of Ordinances* establishes a "Water Quality Revolving Fund" for grants, fines, and voluntary contributions. This fund is intended for the abatement and control of "water quality problems." However, this fund has not been set-up by the Agency, and TRPA currently tracks grants and fines separately in its accounting records. TRPA has not received any voluntary donations for deposit into this account.

For the period July 1, 2005 through June 30, 2010, TRPA has allocated Water Quality Mitigation Fund expenditures and obligations totaling \$4.6 million. Of the \$4.6 million, \$3 million (64 percent) has been invested in water quality treatments, including erosion control and source runoff improvements, and the implementation of Best Management Practices on developed properties. An additional \$659,000 (14 percent) has been allocated for water quality maintenance and operational support. Major efforts involving roadway sand and sediment recovery resulted in an investment of \$633,000 (14 percent) for the purchase of street sweepers. The remaining \$378,000 (8 percent) of the \$4.6 million in expenditures and obligations was invested in forest fuels reduction and thinning to reduce fire risks and improve forest health (Table 12-13).

For the period July 1, 2005 through June 30, 2010, the Agency has incurred Stream Zone Restoration program expenditures and obligations totaling \$1.3 million. Of the \$1.3 million, \$1.25 million (96 percent) has been invested in water quality treatments, including erosion control and source runoff improvements, and the implementation of Best Management Practices on developed properties. An additional \$50,000 (4 percent) has been used for water quality maintenance and operational support (Table 12-13).

AIR QUALITY MITIGATION FUND

The TRPA Air Quality Mitigation Fund was established in Subparagraph 65.2.4 of the *Code of Ordinances*, and is used to offset the regional and cumulative traffic and air quality impacts of additional development. These funds are distributed to local jurisdictions or the Tahoe Transportation District (TTD) for expenditure consistent with the *Regional Transportation Plan* or 1992 Air Quality Plan (AQP), in accordance with Section 65.2.6 of the *Code of Ordinances*. In general, these mitigation funds are used to build bicycle trails, improve intersections, purchase and operate street sweepers, and enhance public transportation systems.

For the period July 1, 2005 through June 30, 2010, the Agency has incurred Air Quality Mitigation Fund expenditures and obligations totaling \$3.5 million. Of the \$3.5 million, \$2.1 million (59 percent) has been invested in pedestrian and bike trails supporting air quality improvements and enhanced recreation. An additional \$747,000 (22 percent) has been invested in transit fleet buses and equipment. As part of the effort in roadway improvements, the Agency has invested \$623,000 (18 percent) in roadway capital improvement projects. The remaining \$40,000 (1 percent) of the \$3.5 million in expenditures and obligations was invested in street sweepers (Table 12-13).

EXCESS AND OFFSITE LAND COVERAGE MITIGATION FUND

The TRPA Excess Land Coverage Mitigation Fund is established in Subsection 30.6 of the *Code of Ordinances*, and is collected in lieu of on-site or off-site land coverage reductions for projects with excess land coverage. Funds are forwarded by TRPA to “land banks” operated by the California Tahoe Conservancy and Nevada State Lands to provide land coverage/impervious surface reduction. Land coverage includes compacted soil or land covered with development such as asphalt or buildings. Land banks achieve land coverage reductions through the purchase and deed-restricting of vacant parcels with development potential, or the purchase of properties with coverage and subsequent removal of coverage. Reducing land coverage has been demonstrated to improve water quality and habitat quality because it allows water to infiltrate the soil rather than flow directly into surface waters, and allows for the reestablishment of native vegetation important for wildlife.

As a practice, TRPA collects “off-site” mitigation funds for new land coverage created in public rights-of-way (for driveway encroachments, etc.). These funds are combined with excess land coverage mitigation funds for distribution to land banks. For the period July 1, 2005 through June 30, 2010, the Agency has incurred Excess and Offsite Land Coverage Mitigation Fund expenditures and obligations totaling \$3 million.

Table 12-13. TRPA Project Type by Mitigation Funding Source (in Dollars)								
Expenditures and obligations for the period July 1, 2005 through June 30, 2010	Water Quality Mitigation	%	Stream Zone Restoration Program	%	Air Quality Mitigation	%	Excess and Offsite Land Coverage Mitigation	%
Erosion Control Projects	\$2,972,904	64%	\$1,242,095	96%	\$ -	-	\$ -	\$ -
Fire Rehabilitation	\$377,977	8%	-	-	-	-	-	-
Water Quality Maintenance and Operational Support	\$659,137	14%	\$50,000	4%	-	-	-	-
Street Sweepers	\$632,961	14%	-	-	\$40,000	1%	-	-
Roadway Capital Improvement Projects	-	-	-	-	\$623,431	18%	-	-
Transit Services Equipment Purchase	-	-	-	-	\$747,231	22%	-	-

Bike and Pedestrian Lane Improvement Projects	-	-	-	-	\$2,060,000	59%	-	-
Land Bank and Operational Support	-	-	-	-	-	-	\$2,925,250	100%
	\$4,642,979	100 %	\$1,292,095	100 %	\$ 3,470,662	100 %	\$2,925,250	100%
Balance	\$1,884,850	-	\$1,597,897	-	\$2,024,101	-	\$10,918,318	-
<p><u>Note:</u> This information is being reported in accordance with subparagraph 16.8 of the Code of Ordinances.</p> <p><u>Source:</u> TRPA mitigation fund accounting records.</p>								

OTHER MITIGATION FUNDS

Shorezone Mitigation Funds

Certain mitigation fees collected for shorezone projects are used to fund studies assessing existing or potential impacts created by shorezone structures, methods for achieving restoration within the shorezone, or to fund fish habitat restoration projects (Subparagraph 86.6, *Code of Ordinances*). Projects that involve the repair of existing facilities are exempt from shorezone mitigation fees in accordance with the *Code of Ordinances*. Currently there is approximately \$59,000 in this fund.

Rental Car Mitigation Fund

Chapter 65.3.1 of the *Code of Ordinances* establishes a Rental Car Mitigation Program, which is intended to assist the achievement and maintenance of Threshold Standards for transportation, air, and water quality. TRPA transfers funds from its Rental Car Mitigation Program fund account to the Tahoe Transportation District (TTD) when it finds that the expenditure is consistent with the *Regional Transportation Plan* and Air Quality Plan (RTP-AQP 1992). The TTD primarily uses these funds to support public transportation systems and the administration of TTD. Revenue and expenses for the TRPA Rental Car Mitigation Program are summarized in Table 12-14, below.

Table 12-14. Rental Car Mitigation Fee Revenue and Expenses (by Fiscal Year, in Dollars).

	2006	2007	2008	2009	2010	Total
Revenue	99,616.83	120,256.50	127,907.50	116,879.00	85,475.50	550,135.33
Expenses	120,334.19	108,987.00	91,048.02	335,166.68	29,213.60	684,749.49
Net	-20,717.36	11,269.50	36,859.48	-218,287.68	56,261.90	-134,614.16
<u>Source:</u> Tahoe Transportation District						